

USSR

UDC 547.341.07

KAABAK, L. V., VARSHAVSKIY, S. L., MYAGKAYA, M. YE., KOSHECHKINA, L. A.,
KALITINA, M. I., and KABACHNIK, M. I.

"Process for the Preparation of Tri-Secondary-Alkylphosphine Oxide"

USSR Author's Certificate No 362024. Filed 18 Jan 71, published 13 Dec 71
(from Otkrytiya, Izobreteniya, Promyshlennyye Obraztsy, Tovarnyye Znaki,
No 2, 1873, p 54)

Translation: This process is improved in that white phosphorous reacts with secondary halide alkyls and magnesium or zinc while being heated, with the subsequent treatment of the reaction mixture with alkali. The desired product can be separated by known methods.

2. The process in number 1 is improved in that the mixture is heated to a temperature of 120-210°C.

3. The processes described in number 1 and 2 are improved in that the treatment of the reaction mixture with alkali is carried out at 270°C.

USSR

UDC 542.91:547.1'118

ABDUVAKHADOV, A. A., ZUPAROVA, K. M., GODOVIKOV, N. N., KABACHNIK, M. I., ASLANOV, Kh. A., and SADYKOV, A. S., Institute of Organoelemental Compounds, Academy of Sciences USSR, and Tashkent State University imeni V. I. Lenin, Tashkent

"The Synthesis of Some O-Ethyl-S-alkyl Alkylthiophosphonates"

Moscow, Izvestiya Akademii Nauk SSSR, Seriya Khimicheskaya, No 7, Jul 73, pp 1659-1661

Abstract: It was established in earlier work by the authors that the anticholinesterase activity of O-alkyl-S-alkyl methylthiophosphonates increases with an increasing length and degree of branching of the alkyls at O and S. However, the effect of the alkyl at P on the physiological activity of compounds of this type had not been studied. To carry out this study, the O-ethyl-S-butyl alkylthiophosphonates EtO(R)P(O)SBu (I; R = Et, n-Pr, n-Bu), O-ethyl-S-(beta-ethyl-mercaptoethyl) alkylthiophosphonates $\text{EtO(R)P(O)SC}_2\text{H}_4\text{SEt}$ (II; R = Et, n-Pr, n-Bu), and methylsulfomethylates of II (III) were synthesized. O,O-Diethyl alkylphosphonates $(\text{EtO})_2\text{P(O)R}$, which were prepared starting with diethyl phosphite as 1/2

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ABDUVAKHABOV, A. A., et al, Izvestiya Akademii Nauk SSSR, Seriya Khimicheskaya, No 7, Jul 73, pp 1659-1661.

described in earlier work, formed the acid chlorides EtO(R)P(O)Cl (IV on being reacted with PCl_5 . IV, on being reacted with butyl-mercaptan and beta-mercaptodiethyl sulfide, yielded I and II, respectively. Compounds III were obtained by reacting II with dimethyl sulfate. The physical properties of the compounds synthesized are listed in tables.

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USSR

UDC 541.49+541.65+546.18+546.31

SINYAVSKAYA, E. I., SHEKA, Z. A., MEDVED', T. YA., PISAREVA, S. A.,
KABACHIK, M. I., Institute of Physical Chemistry imeni A. V.
Pisarzhevski, Academy of Sciences, UkSSR, Kiev, and Institute of
Heteroorganic Compounds, Academy of Sciences, USSR, Moscow

"Reaction of Some Metal Halides with Tetraphenyl- and Tetra-
butylalkylenediphosphine Dioxides"

Moscow, Zhurnal Neorganicheskoi Khimii, vol 18, No 9, Sept 73,
pp 2427-2433

Abstract: The reaction of alkali metal halides and cupric chlo-
ride with $(C_6H_5)_2P(O)(CH_2)_nP(O)(C_6H_5)_2$ ($n = 1$ to 3) and $(C_4H_9)_2P-$
 $(O)(CH_2)_nP(O)(C_4H_9)_2$ ($n = 1$ to 6) was studied by measuring the
electrical conductivity of the respective salts in nonaqueous sol-
vents. Owing to formation of electrically neutral complexes, the
electrical conductivity decreased when the subject compounds were
added to LiCl or LiI or to $CuCl_2$. The most effective complexes
of the inorganic compounds were the compounds with the methylene
bridge with $n = 1$ or 2 . With higher n values the complex
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SINYAVSKAYA, E. I., et al., Zhurnal Neorganicheskoi Khimii, vol 18, No 9, Sept 1973, pp 2427-2433

formation decreased sharply. This is in agreement with published data on protonation in such dioxides, which show formation of stable cyclic structures for $n = 1$ or 2 .

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USSR

UDC 547.26'118

MARCHENKO, V. A., YAKUSHIN, F. S., TSVETKOV, YE. N., KABACHNIK, M. I., and SHATENSHTEYN, A. I.

"Effect of Solvating Organophosphorus Additives on the Kinetics of Protophilic Deutero Metabolism"

Leninograd, Zhurnal Obshchey Khimii, Vol XLIII (CV), No 1, 1973, pp 3-9

Abstract: A study was made of the kinetics of the reaction of deuterohydrogen metabolism of 9-D-fluorene with tertiarybutyl alcohol catalyzed with tertiary lithium butylate in the presence of additives of organophosphorus compounds with different substitutions on the phosphorus atom.

An analysis of the relation between the enthalpy and entropy of the activation of the reaction indicates the presence of two reaction series corresponding to different mechanisms of solvation of the alcoholate cation by additives with one and two electron donor centers. The efficiency of the organophosphorus compounds as solvating agents in the given reaction depends to a great extent on the spatial factors. A linear relation was found between the values of $\lg k$ (25°C) and the values of H defined for the same solutions with which the kinetic measurements were performed. The indicator was CH-acid similar with respect to structure to the substrate of the deutero-hydrogen exchange reaction.

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USSR

UDC 547.558.1

MASTRYUKOVA, T. A., SUYERBAYEV, KH. A., FEDIN, E. I., PETROVSKIY, P. V.,
MATROSOV, YE. I., and KARACHNIK, M. I., Institute of Metal Organic Compounds,
Acad. Sc. USSR

"Diphosphacyclohexadienone"

Leningrad, Zhurnal Obshchey Khimii, Vol 43 (105), No 5, May 73, p 1195

Abstract: 3,3,5,5-Tetraphenyl-3,5-diphosphacyclohexadienone, m.p. 188.5-192°, was synthesized by the reaction of 3,3,5,5-tetraphenyl-3,5-diphosphoniacyclohexanone with triethylamine. On the basis of IR and NMR ^{31}P data it appeared that the new compound exists as diphosphacyclodienone substituted at the phosphorus atom; there were no indications of the existence of diphosphaphenolic structure.

1/1

USSR

UDC 547.241 + 547.62 + 547.442

MASTRUKOVA, T. A., ALADZHEVA, I. M., PETROVSKIY, P. V., MATROSOV, YE. I., and
KABACHNIK, M. I., Institute of Organometallic Compounds

"Acidity and Tautomerism of beta-Ketophosphonium Salts. Tautomerism of Tri-
phenyl(diacetylmethyl)phosphonium Salts"

Leningrad, Zhurnal Obshchey Khimii, Vol 43 (105), No 5, May 73, pp 991-997

Abstract: According to the IR- and NMR-Spectroscopic data the salts of tri-
phenyl(acetylbenzoylmethyl)-, triphenyl(acetylcarboethoxymethyl) and tri-
phenyl(diacetylmethyl)phosphonium exist in the enole form; they are in the trans-
enolic orientation with the protons of the hydroxyl groups being involved in
intermolecular hydrogen bonding with the anions or the oxygen of the carbonyl
groups. Triphenyl(dicarboethoxymethyl)phosphonium chloride exists in the dicar-
bonyl form.

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USSR

UDC 547.241

MATRCISOV, YE. I., TSVETKOV, YE. N., MALEVANNAYA, R. A., and KAZACHNIK, M. I.,
Institute of Element Organic Compounds, Academy of Sciences USSR

"Infrared Spectra and the Association of Phosphinylacetic Acids"

Leningrad, Zhurnal Obshchey Khimii, Vol 42(104), No 8, 1972, pp 1695-1700

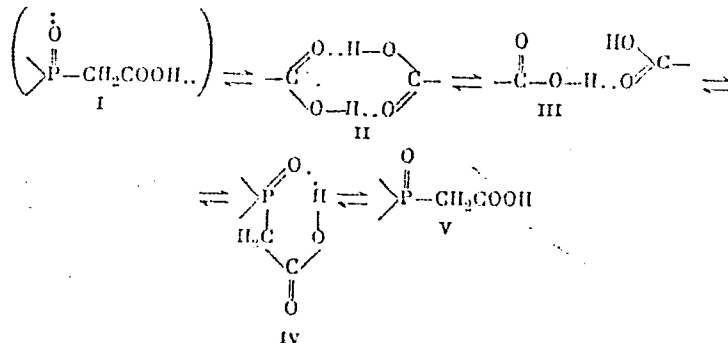
Abstract: Acids of the type $\begin{matrix} A & O \\ & \nearrow \quad \searrow \\ & P-CH_2COOH \end{matrix}$ -- for the compounds A = B =
Bu, Ph, p-CH₃C₆H₄, p-ClC₆H₄, EtO, and PhO; A=Ph, B=Et; A=iSO Bu, A=Ph; A=EtO,
B=Ph and A=OCH₃, B=Ph -- were studied. Ir spectra were taken, using solid
KBR pellets to examine the following types of associations which normally
occur in solution:

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MATROSOV, YE. I., et al., Zhurnal Obshchey Khimii, Vol 42(104), No 8, 1972, pp 1695-1700



In solution the dominant form depends on the groups attached to the P atom and on the solvent. In proton-acceptor solvents, the acid forms H bonds with the solvent. Forms (II) and (V) predominate in inert solvents. In the solids the acids associate due to the formation of intermolecular hydrogen bonds involving parts of the phosphoryl group.

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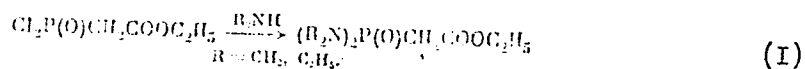
UDC 547.241

MALEVANNAYA, R. A., TSVETKOV, YE. N., and KABACHNIK, M. I., Institute of Elementoorganic Compounds, Academy of Sciences USSR

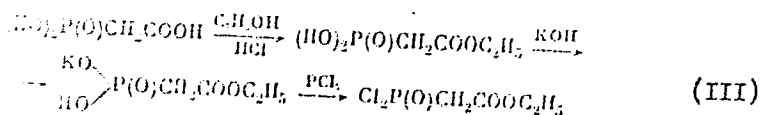
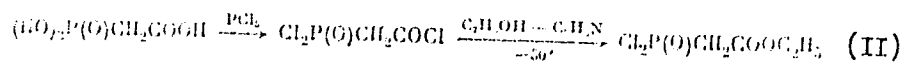
"Potassium Salts of Tetraalkyldiamidophosphinylacetic Acids"

Leningrad, Zhurnal Obshchey Khimii, Vol 42(104), Vyp 4, 1972, pp 765-769

Abstract: Experimental procedures are given for the synthesis of the ethyl esters of tetramethyl- and tetraethyldimidophosphinyl acids via reaction (I)



The starting material was obtained via two methods (reactions II and III):

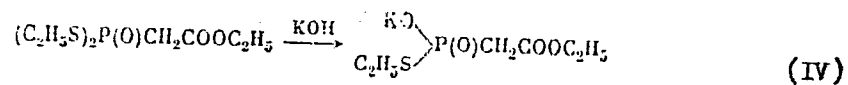


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MALEVANNAYA, R. A., et al., Zhurnal Obshchey Khimii, Vol 42(104), Vyp 4, 1972, pp 765-769

The $\text{Cl}_2\text{P}(\text{O})\text{CH}_2\text{COOC}_2\text{H}_5$ was reacted with ethylmercaptan in the presence of triethylamine replacing both Cl^- groups with $(\text{C}_2\text{H}_5\text{S})$. This compound underwent base hydrolysis according to formula IV to the potassium salt.



Physical data, percent composition, NMR and IR constants are given.

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USSR

UDC 547.241

TSVETKOV, YE. N., MAKHAMATKHANOV, M. M., LOBANOV, D. I., and KABACHNIK, M. I.,
Institute of Elementoorganic Compounds, Academy of Sciences USSR

"Electronic Influence of Phosphorus-Containing Substituents: The σ^- and σ_m
Constants for Dimethylphosphino-, Dimethylphosphinyl, dimethylethiophosphinyl,
and Trimethylphosphonyl Groups"

Leningrad, Zhurnal Obshchey Khimii, Vol 42(104), Vyp 4, 1972, pp 769-779

Abstract: The synthesis was reported for a number of phenol derivatives having the groups $(CH_3)_2P$, $(CH_3)_2P(O)$, $(CH_3)_2P(S)$, and $CH_3)_3P^+$ in the meta and para positions. The electrophobic character (σ^- and σ_m) of each derivative was calculated. The ionization constant of each derivative was measured by potentiometric titration in water and in a 1:1 by volume mixture of ethanol and water. The influence of the σ^- and σ_m on the pK_a values (7.55 to 10.90) is essentially the same for all groups. The Bronsted equations describing the relationship between the pK_a for water and the pK_a for alcohol are given. The C-H vibrational frequencies were determined by IR; NMR spectra were also examined. All the data indicate that the studied substituents are π -acceptors and are directly related to reactive electron-donor centers.

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USSR

UDC 547.241

MIRONOVA, Z. N., TSVETKOV, Ye. N., PETROVSKAYA, L. I., NEGREBETSKIY, V. V.,
NIKOLAYEV, A. V., and KABACHNIK, M. I., Institute of Inorganic Chemistry,
Siberian Division, Academy of Sciences USSR, and Institute of Heteroorganic
Compounds, Academy of Sciences USSR

"Synthesis Starting With Tetraoxymethylphosphine Chloride; Aminomethyl-
phosphines and Their Oxides"

Leningrad, Zhurnal Obshchey Khimii, Vol 42(104), Vyp 10, 1972, pp 2152-2158

Abstract: Eleven aminomethylphosphines, general formula $R_nP(CH_2NR'_2)_{3-n}$ were synthesized from tri(acetoxymethyl)phosphine, whose synthesis the authors have previously reported, and secondary amines in aqueous methanol in the presence of potassium hydroxide. This synthetic pathway is said to have fewer difficulties than those described previously, and to proceed via a saponification mechanism. The yield, boiling point, refractive index, density, observed and calculated molar refraction, percentages of C, H, and P, and formula are reported. Using hydrogen peroxide in acetone the phosphines were oxidized to their corresponding oxides. Several previous synthetic pathways are listed and some of the constants are reported for ten of these. Proton magnetic resonance and double resonance

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MIRONOVA, Z. N., et al., Zhurnal Obshchey Khimii, Vol 42(104), Vyp 10, 1972, pp 2152-2158

were used for confirmation of structure; the chemical shift and spin-spin coupling constant of the PCH_2N interaction are given for eleven of the compounds synthesized. An intense doublet at $1130\text{--}1165\text{ cm}^{-1}$ in the IR spectrum of tri(dimethylaminomethyl)phosphine is interpreted as an indication of rotational isomerism. All operations with trivalent phosphorus compounds were conducted under argon.

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UDC 547.241

MASTRYUKOVA, T. A., SUYERBAYEV, Kh. A., PETROVSKIY, P. V., MATROSOV, Ye. I.,
and KABACHNIK, M. I., Institute of Metal Organic Compounds, Acad. Sc., USSR

"Acidity and Tautomerism of β -Ketophosphonium Salts of 3,3,5,5-Tetraphenyl-
3,5-diphosphoniumcyclohexanone"

Leningrad, Zhurnal Obshchey Khimii, Vol 42 (104), No 12, Dec 72, pp 2620-
2625

Abstract: Synthetic methods have been developed for 3,3,5,5-tetraphenyl-
3,5-disphosphoniumcyclohexanone (I) salts. Solutions of 1.52 g tetra-
phenylmethylenediphosphine and 0.86 g symm-dibromoacetone in 30 ml
tetrahydrofuran were slowly added to 90 ml of boiling THF with stirring.
A finely crystalline material was obtained and reprecipitated from hexane-
ethanol to yield the dibromide of (I), m.p. 230-255°C. To obtain the
dichloride of (I), m.p. 264-266, 4.69 g of symm-dichloroacetone in 150 ml
acetonitrile was added to 14.19 g tetraphenylmethylenediphosphine in 950
ml acetonitrile, refluxed for 1.5 hr and cooled to precipitate the product.
Sodium tetraphenylborate in absolute ethanol added to the dibromide of (I)
in absolute ethanol at room temperature with stirring yields the tetra-
phenylborate of (I), m.p. 182-185°C. To obtain the diperchlorate of (I),
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MASTRYUKOVA, T. A., et al., Zhurnal Obshchey Khimii, Vol 42 (104), No 12, Dec 72, pp 2620-2625

m.p. 202-204°C, an aqueous solution of sodium perchlorate was added to an aqueous solution of the dichloride of (I). The salts obtained have an enolic structure in the crystalline state; in solutions an enol-ketone equilibrium is established.

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USSR

UDC 547.26'118

MATROSOV, Ye. I., IOFFE, S. T., and KABACHNIK, M. I., Institute of Metal Organic Compounds, Academy of Sciences USSR

"IR Spectra and Hydrogen Bonding in Substituted Esters of Formylmethylphosphonic Acids"

Leningrad, Zhurnal Obshchey Khimii, Vol 42 (104), No 12, Dec 72, pp 2625-2630

Abstract: Substituted esters of formylmethylphosphonic acids are excellent subjects for the study of hydrogen bonding since they enolize forming compounds with a hydroxymethylene group capable of intra- and intermolecular H-bonding. IR spectra of esters of the type $(EtO)_2P(O)CH(CHO)R$, where $R = Cl, Br, Ph$ or CN have been investigated in solid state and in several solutions with varying concentration of the substrate. In the solid state all are in trans-enolic form with strong intermolecular hydrogen bonding, as reflected by intensive infrared absorption bands at 2700 and 3050-2950 cm^{-1} . In solution an equilibrium exists of all of the tautomeric forms: aldo-, trans-, and cis-enolic forms. The equilibrium shifts, depending on the solvent, on the degree of dilution and on the type of substituent. No absorption maxima were observed indicating the presence of free OH groups.
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USSR

UDC 547.26'118

GILYAROV, V. A., and KABACHNIK, M. I., Institute of Heteroorganic Compounds, Academy of Sciences USSR

"Synthesis of N-Phosphorylimidophosphates, Substances Possessing Herbicidal and Defoliation Activity"

Leningrad, Zhurnal Obshchey Khimii, Vol 42(104), Vyp 10, 1972, pp 2148-2152

Abstract: Twenty-two N-phosphorylimidophosphates were synthesized by reacting trialkyl phosphites with dialkyl azidophosphates or ethyl methyl azidophosphonates. These substances have been reported to have herbicidal and defoliating properties. The yield, boiling point, refractive index, density, calculated and observed molar refraction, formula, percentages of C, H, and P and the frequency of IR absorption of the phosphorus-nitrogen double bond are reported for each. Some of the products are results of imide-amide of imide-imide rearrangements. Four dialkyl azidophosphate precursors were synthesized by reacting dialkyl chlorophosphates with sodium azide. The yield, boiling point, refractive index, density, calculated and observed molar refraction, and percent N, and formula are reported for each.

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USSR

UDC 547.785.5

KABACHNIK, M. I., Academician, TIKHONINA, N. A., KOROLEV, B. A., GILYAROV, V. A., Institute of Organoelemental Compounds, Academy of Sciences of the USSR, All-Union Scientific Research Institute of Organic Intermediate Products and Dyes, Moscow

"2-Phosphabenzoxazoles -- a New Type of Cyclic Imidophosphoric Compounds"

Moscow, Doklady Akademii Nauk SSSR, Vol 204, No 6, 21 Jun 72, pp 1352-1355

Abstract: The authors study the basicity of aromatic (or pseudoaromatic) rings containing the $P=N$ bond but without strongly electronegative substituents associated with the nitrogen atom. The 2-phosphabenzoxazole system is selected as a representative, being a cyclic analog of phenoxy N-phenylimidophosphorans, and a phosphorus analog of benzoaxazole. The yields, constants and results of analyses of the 2-phosphabenzoxazoles are given together with the methods of synthesis developed by the authors. An investigation of some of the properties of these compounds shows that a sharp reduction in basicity of the $P=N$ bond can be attributed to closure of a five-member ring which might possibly be aromatic in nature.

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USSR

UDC: 547.26.112

MATROSOV, Ye. I., TSVETKOV, Ye. N., LOBANOV, D. I., MAL'KIN, R. A.,
KAEACHNIK, M. I., Institute of Organoelemental Compounds, Academy of Sciences
of the USSR

"Association of Substituted Phosphinylbenzoic and Phosphinyl-p-toluic Acids
According to the Data of Infrared Spectra"

Leningrad, Zhurnal Obshchey Khimii, Vol 42(104), No 6, Jun 72, pp 1218-1223

Abstract: IR-spectroscopy was used to study the nature of association in
carboxylic acids containing the phosphoryl group. The study specimens were
chiefly certain phosphinylbenzoic $P_2P(O)C_6H_4COOH$ and CCl_3 -phosphinyltoluic
 $R_2P(O)CH_2C_6H_4COOH$ acids with various substituents at the phosphorus atom. It
was shown that in the crystalline state association takes place principally
through the formation of strong intermolecular H bonds with participation of
the phosphoryl groups. A reduction in the basicity of the phosphorus substit-
uent in the case of diphenylthiophosphinyl-substituted acids leads to dimeriza-
tion on the carboxylic acid pattern. In chloroform, the polymer associates
formed through the participation of phosphoryl groups in the H bonds are des-
troyed, and dimer association becomes a predominant type. In proton-acceptor
solvents (tetrahydrofuran, acetonitrile), molecules of free acids bound to the
solvent by H bonds are observed in addition to the polymer associates.

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USSR

UDC 542.97:547.1'118

KABACHNIK, M. I., GODOVIKOV, N. N., PISARENKO, V. V., and ZAKHAROV, L. S.,
Institute of Metal Organic Compounds, Acad. Sc. USSR

"Preparation of Polyfluoroalkyl Esters of Alkyl and Aryl Phosphonates"

Moscow, Izvestiya Akademii Nauk SSSR, Seriya Khimicheskaya, No 7, Jul 72,
pp 1667-1669

Abstract: Phosphorylation of polyfluoroalkanols with acid chlorides of the
alkyl- or arylphosphonic acids is catalyzed by the metal salts of the II group
of periodic system. A series of polyfluoroalkyl esters of alkyl and arylphos-
phonic acid has been obtained by this reaction in quite a pure state.

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USSR

UDC 547.558.1

MASTRYUKOVA, T. A., ALADZHEVA, I. M., MATROSOV, YE. I., KABACHNIK, M. F.,
Institute of Organoelemental Compounds, Academy of Sciences of the USSR

"Acidity and Tautomerism of β -Ketophosphonium Salts. Synthesis and Acid-Base Properties of Triphenyl(Diacetylacetyl)phosphonium Salts"

Leningrad, Zhurnal Obshchey Khimii, Vol 42(104), No 7, Jul 72, pp 1470-1473

Abstract: Diacylphosphinomethylenes (I) and the corresponding phosphonium salts (II) were synthesized, and their acid-base properties were studied. Compounds (I) have been previously described, and the first representative of (II) was reported in Zhurnal Obshchey Khimii in 1971 (Vol 41, p 2336), triphenyl(acetylbenzoylmethyl)-phosphonium chloride. New members of the series were synthesized by reacting hydrogen halides or trifluoroacetic acid with the corresponding phosphinomethylenes (I). The resultant salts are completely stable with the exception of triphenyl(diacetylacetyl)phosphonium chloride. The acid-base properties of the compounds were studied by a potentiometric method in water-ethanol solutions and in nitromethane. It was found that phosphinomethylenes are weak bases, and the corresponding phosphonium salts are fairly strong acids.

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USSR

UDC 541.69:661.718.1

MASTRYUKOVA, T. A., SHIPOV, A. E., GORBENKO, E. B., KABACHNIK, M. I., KAGAN, YU. S., YERSHOVA, YE. A., SHABANOVA, M. P., and SAVCHENKO, K. N., Institute of Heteroorganic Compounds, Academy of Sciences USSR

"A New Type of Selective Organophosphorus Insecticides and Acaricides. 2. Methyl dithiophosphonic Acid Derivatives"

Moscow, Izvestiya Akademii Nauk SSSR, Seriya Khimicheskaya, No 9, Sep 71, pp 2003-2005

Abstract: In an earlier article the authors examined a new type of selective insecticides and acaricides, viz. derivatives of mono- and dithiophosphoric acids containing amino acid residues, their esters and methylanides. The present article deals with an analogous series of methyl dithiophosphonates, obtained by the reaction of the corresponding chloroacetyl derivatives of amino acids or their esters with ammonium O-ethyl methyl dithiophosphonate. It was found that compounds of this series are more toxic for arthropods and warm-blooded animals than the corresponding dithiophosphates. Substances containing a free carboxyl group are the least toxic. A study of the insecticidal and acaricidal activity of the resultant compounds shows that they are more characterized by acaricidal activity and that they are more

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MASTRYUKOVA, T. A., et al., Izvestiya Akademii Nauk SSSR, Seriya Khimicheskaya, No 9, Sep 71, pp 2003-2005

active insecticides and acaricides than the corresponding phosphates, but the selectivity of their effect on arthropods is weaker than in the case of dithiophosphates. A comparison of the effect of these two groups on arthropods and warm-blooded animals shows greater selectivity in the case of methyl dithiophosphonates.

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USSR

UDC 541.632+538.113:661.718.1

MASTRYUKOVA, T. A., SHIPOV, A. E., VAYSBERG, M. S., PETROVSKIY, P. V., and
KARACHINIK, M. I., Institute of Heteroorganic Compounds, Academy of Sciences
USSR

"PMR Study of Diastereoisomerism of Substituted O-Ethyl Methylthiophos-
phonates"

Moscow, Izvestiya Akademii Nauk SSSR, Seriya Khimicheskaya, No 8, Aug 71, p
1841

Abstract: In compounds of the general formula $\text{CH}_3(\text{C}_2\text{H}_5\text{O}(\text{P}(\text{S})\text{SCH}_3\text{O}(\text{O})\text{CHCH}(\text{R})-\text{COOH})$ [R = H (I), CH_3 (II) and $i\text{-C}_3\text{H}_7$ (III)], (II) and (III) contain two asymmetric centers separated by five single bonds. Nevertheless, the PMR spectra of the resultant mixture of diastereomers clearly shows two doublet signals for the methyl protons corresponding to the two diastereomers. The difference in chemical shifts varies according to compound and solvent from 0.06 to 0.1 p.p.m., with the maximum for compound (III) in benzene. This difference is great for substances in which the asymmetric centers are far removed from each other. Thus, it is shown that diastereomerism can be found in the PMR spectra for molecules with separated asymmetric centers.
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USSR

UDC 547.241:541.45

KOVTUN, V. Yu., CILYAROV, V. A., KOROLEV, B. A., MATROSOV, Ye. I., and
KABACHNIK, M. I., Institute of Organometallic Compounds, Acad. Sc. USSR
 and Scientific Research Institute of Intermediates and Dyes

"Basicity and Nucleophilicity of Some Methylenediphosphinediimines"

Leningrad, Zhurnal Obshchey Khimii, Vol 41 (103), No 4, Apr 71, pp 772-773

Abstract: A series of substituted tetraphenylmethylenediphosphinedi-(N-phenylimines) was obtained from tetraphenylmethylenediphosphine by treatment with two moles of substituted phenylazides and converted to monomethylenediphosphines by refluxing them in benzene in presence of methyl iodide. Equimolar quantities of tetraphenylmethylenediphosphine react with benzyl or p-nitrobenzyl bromide in benzene to give the corresponding benzylphosphonium salts which upon reaction with phenylazides yielded di(benzylbenzyl(or p-nitrobenzyl)) [diphenyl(N-phenyl) diphosphorylmethyl(or phosphonylmethyl)] phosphonium bromides. The pK_b values were determined in nitromethane for all the compounds obtained. It was determined that the basicity of the nitrogen atom in these compounds depends on the nature of substituents in the phenyl ring bound to the imine nitrogen atom. Hammett's equation applies to these compounds.

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USSR

UDC 543.422.4.547.1'118

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MATROSOV, YE. I., BARANOV, G. M., PEREKALIN, V. V., KARACHNIK, M. I., and
MASTRYUKOVA, T. A., Institute of Heteroorganic Compounds, Academy of Sciences
USSR, and Leningrad State Pedagogical Institute imeni A. I. Gertsen

"IR Spectra and Hydrogen Bonds in Some Organophosphorus Derivatives of Nitro
Alcohols"

Moscow, Izvestiya Akademii Nauk SSSR, Seriya Khimicheskaya, No 11, Nov 71,
pp 2572-2575

Abstract: The article describes results of a spectral study of organophos-
phorus derivatives of nitro alcohols -- 0,0-dialkyl- α -hydroxy- β -nitro-
alkyl phosphonates of the type: $(RO)_2P(O) - C(OH)CH_3 - CHR'NO_2$; $R = C_2H_5$ (I),
 $1-C_3H_7$ (II); $R' = H$ (a), CH_3 (b), C_6H_5 (c). The results indicate the formation
in the solid state of intermolecular H bonds formed by OH and P=O groups.
There is equilibrium of free and associated molecules in solutions of the
phosphonates.

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USSR

UDC 541.67:547.26'118

MASTRYUKOVA, T. A., SPIVAK, L. L., GRIGOR'YEVA, A. A., URZHUMTSEVA, Ye. K.,
and KARACHNIK, M. I., Institute of Organoelemental Compounds, Academy of
Sciences USSR, Rhar'kov State University

"Ionization Constants of Dithiophosphoric Acids in Absolute Ethanol"

Leningrad, Zhurnal Obshchey Khimii, Sep 71, Vol 41, No 9, pp 1938-1941

Abstract: Measurements were made of the ionization constants of organic dithiophosphoric acids in absolute ethanol. There exists a linear relationship between the ionization constant values of acids and E_s of the substituents at the phosphorus atom. It is shown that the conditions for the solvation of molecules and anions of dithiophosphoric acids in 100% ethanol markedly differ from those in 7 and 80% aqueous ethanol. In switching from 7 to 100% ethanol, ApK_a remains constant for all acids under study. In 80 to 100% ethanol, ApK_a changes and increases from dialkyl- dithiophosphoric to dithiophosphonic and dithiophosphinic acids. In the former case, ApK_a depends largely on changes in the solvation energy of molecules while in the latter case, it depends on that of ions. The difference in the change of the solvation energy of ions and molecules results from the differentiating action of the solvent on the strength of

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USSR

MASTRYUKOVA, T. A., et al., Zhurnal Obshchey Khimii, Sep 71, Vol 41, No 9,
pp 1938-1941

the acids. In the present case alcohols appear to have the highest differentiating action on the strength of dithiophosphoric acid. The difference between the strength of dithiophosphoric acids in alcohol and that in aqueous alcohol is close to 2.5 orders of magnitude.

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USSR

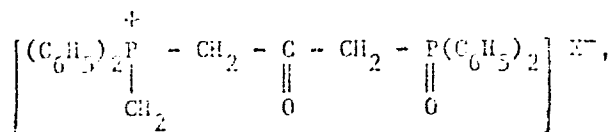
UDC 547.241

MASTRUKOVA, T. A., SUYERBAYEV, KH. A., PETROVSKIY, P. V., MAMOSOV, YE. I.,
Academician KABACHNIK, M. I.

"Acidity and Tautomerism of Some β -Ketophosphonium Salts"

Moscow, Doklady Akademii Nauk SSSR, Vol 202, No 2, 1972, pp 354-357

Abstract: A study of diphenylphosphinyl-substituted β -ketophosphonium salts of the following structure:



where $\text{X} = \text{Cl}^-$, ClO_4^- , BF_4^- , BPh_4^- and CF_3COO^- are anions was made to consider the problem of whether introduction of radicals increasing the CH-acidity but capable of the formation of hydrogen bonds with OH-radicals of enol form into a molecule of β -ketophosphonium salt must lead to enolization. Paramagnetic resonance spectra and infrared spectra of the investigated salts are presented and analyzed. In contrast to simple β -ketophosphonium salts, their

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MASTRYUKOVA, T. A., et al., Doklady Akademii Nauk SSSR, Vol 202, No 2, 1972, pp 354-357

diphenylphosphinyl-substituted derivatives are capable of enolization in solutions. This property cannot be explained only by the increase in CR-acidity as a result of introducing the diphenylphosphinyl radical. The cause of the enolizability lies in stabilization of the enol form under the effect of the diphenylphosphinyl group. In the case of complex anions enolization does not occur. Thus, for enolization both the P(O)-radical and CF_3COO^- or Cl^- anions must be present.

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USSR

MAKINENKAYA, R. A., SHCHERBA, YE. A. and KARACHUK, M. I.: Institute of
Hetero-Organic Chemistry, USSR Academy of Sciences

"Dialkylphosphorylphosphonic acids"

Leningrad, Zhurnal Obshchei Khimii, Vol XLII, No 11, Nov 1972, pp 2329-2331

Abstract: This study is devoted to the problem of synthesizing dialkyl-
phosphorylphosphonic acids, of which only two representatives have been reported
in the published literature--diethyl- and dipropylphosphorylphosphonic acids.
Synthesized were the following: 1) diethyl-, diisobutyl- and isopentylphosphoryl-
phosphonic acids; 2) diethyl phosphonate of the corresponding 1,1,1-trichloro-
dipropylphosphonic acid; 3) the synthesis of dialkylphosphorylphosphonic acids
with benzyl and phenyl groups; 4) the synthesis of dialkylphosphorylphosphonic acids
3) isobutyl ester of diisobutyl phosphorylphosphonic acid; 4) the synthesis of
chloroacetate with the potassium salt of dipropylphosphonic acid; 5) the synthesis
of dipropylphosphorylphosphonic acid; and 6) the synthesis of dialkylphosphoryl-
phosphonic acids, through substitution of the corresponding acid.

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USSR

U.S. 587.00110

GILYAROV, V. A., TIMOSHINA, N. A. and MARASHNIK, A. I.; Institute of
Heteroorganic Compounds, USSR Academy of Sciences

"Reactions of Imides of Phosphorus Acids with Phosphorylating Agents and
Trimethylchlorosilane"

Leningrad, Zhurnal Obshchey Khimii, Vol. XLII, No. 11, Nov 1971, pp 2335-2337

Abstract: Substances of the type $[(C_2H_5O)_2P(O)]_nH_2N_2$ are obtained from
derivatives of endocyclic phosphates $(RO)_2P(O)H$ and phosphoryl chloride. How-
ever, no one has succeeded in synthesizing bis(alkenyl, terminal) phosphates.
sodium diphenyl-*N*-methylcarbamate. The reaction of bis(alkenyl, terminal) com-
pounds with certain phosphoryl chlorides and with trimethylchlorosilane. It
was found possible to synthesize diphenylphosphonium from bis(alkenyl, terminal) com-
pounds and phosphoryl chloride and trimethylchlorosilane. The bis(alkenyl,
phenyl)phosphonium compounds and trimethylchlorosilane.

UDC 547.461

USSR

MASTRYUKOVA, T. A., SHIPOV, A. E., SUYERBAYEV, Kh. A., and ~~KARACHNIK, M. I.~~
Institute of Metal Organic Compounds, Acad. Sc. USSR

"Synthesis of Some New Potential Myorelaxants"

Leningrad, Zhurnal Organicheskoy Khimii, Vol 8, No 4, Apr 72, pp 681-682

Abstract: Reaction of succinyl dichloride with glycine or sarcosine ethyl ester yields diethyl esters of succinyldiglycine or succinyldisarcosine, which can be transesterified to 2-dimethylaminoethyl esters using 2-dimethylaminoethanol, and finally after a treatment with dimethyl sulfate or methyl bromide, they yield choline esters. Reaction of N,N'-disuccinylethylenediamine with ethylene bromohydrin in presence of dicyclohexylcarbodiimide yields its di-(2-bromoethyl) ester which, after treatment with trimethylamine, gives the dicholine ester of N,N'-disuccinylethylenediamine. All compounds are weak myorelaxants.

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USSR

UDC 547.26'118'558.1

GODOVIKOV, N. N., KARDANOV, N. A., and KABACHNIK, M. I., Institute of Elementorganic Compounds, Academy of Sciences of the USSR

"Synthesis of O-(β -Alkylmercaptoethyl) Diphenylphosphinates, S-(β -Alkylmercaptoethyl) Diphenylthiophosphinates and Their Methiodides"

Leningrad, Zhurnal Obshchey Khimii, Vol 42(103), No 2, Feb 72, pp 273-276

Abstract: A number of O-(β -alkylmercaptoethyl) diphenylphosphinates, S-(β -alkylmercaptoethyl diphenylthiophosphinates and the corresponding methiodides were synthesized. The O-(β -alkylmercaptoethyl diphenylphosphinates were produced by interacting diphenylphosphinoyl chloride with β -hydroxyethyl alkyl sulfides in the presence of triethylamine. The S-(β -alkylmercaptoethyl) diphenylthiophosphinates were synthesized by first converting β -hydroxyethyl- alkyl sulfides to β -chloroethyl alkyl sulfides by treatment with thionyl chloride. The resultant β -chloroethyl alkyl sulfides were then reacted with potassium diphenylthiophosphinate to obtain the S-(β -alkylmercaptoethyl diphenylthiophosphinates. The corresponding methiodides were synthesized by treating the resultant phosphinates with methyl iodide. The starting β -hydroxyethyl alkyl sulfides

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USSR

GODOVIKOV, N. N., et al., Zhurnal Obshchey Khimii, Vol 42(103), No 2,
Feb 72, pp 273-276

for the reactions were synthesized by treating thiourea in order with alkyl bromides, an aqueous solution of potassium hydroxide, and ethylene chlorohydrin, without isolation of the intermediate products. The synthesized compounds are analogs of the physiologically active O-ethyl S-(β -alkyl-mercaptoethyl) methylphosphonates.

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USSR

UDC 541.12:542.61:541.6:547.1'118

KARACHNIK, M. I., LASKORIN, B. N., BERTINA, L. E., MEDVED', T. YA., KOSSYKH, V. G., YUDIN, K. S., BERKMAN, Z. A., and NEPRYAKHIN, A. M., Institute of Hetero-Organic Compounds, USSR Academy of Sciences

"Dependence of the Extraction Ability of the Dioxides of Tetraarylmethylene Diphosphines Upon Their Structure"

Moscow, Izvestiya Akad. Nauk SSSR, Seriya Khimicheskaya, No 1, Jan 72, pp 65-70

Abstract: The connection between extraction ability and structure is currently being widely studied, but so far only in the case of monodentate neutral organophosphorus compounds; the corresponding bidentate compounds, with two phosphoryl groups in the molecule, have gone completely unstudied.

Using the extractant dilution method, the authors determined the composition of the extracting complexes of uranyl nitrate with dioxides of the tetraarylmethylene diphosphines containing various substitutes in the meta- and para-positions of the phenyl rings. Effective extraction constants of uranyl nitrate for a series of tetra-substituted dioxides of the methylene-diphosphines were computed. Effective extraction constants for complexes with three molecules of the extractant were found to correlate well with the Hammett constant, and with the σ^+ constant -- something not observed in the case of

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USSR

KABACHNIK, M. I., et al.: Izvestiya Akad. Nauk SSSR, Seriya Khimicheskaya,
No 1, Jan 72, pp 65-70

complexes with two molecules of the dioxide. Finally, the connection between the extraction ability of the diphosphines and their alkalinity was found to be a linear one. Various tables and graphs are included in the paper.

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USSR

UDC 542.91.547.1'118

ZAKHAROV, L. S., PISARENKO, V. V., GODOVIKOV, N. N., and KABACHNIK, M. I.,
Institute of Heteroorganic Compounds, Academy of Sciences USSR

"Catalytic Phosphorylation of Polyfluorinated Alcohols. 1. Preparation of
Tripolyfluoroalkyl and Arylpolyfluoroalkyl Phosphates"

Moscow, Izvestiya Akademii Nauk SSSR, Seriya Khimicheskaya, No 11, Nov 71,
pp 2503-2509

Abstract: The authors found that phosphorus oxychloride reacts with alcoholates of polyfluorinated alcohols in absolute ether at room temperature to give symmetric polyfluorotrialkyl phosphates. However, in the interaction of aryl chlorophosphates with alcoholates of polyfluorinated alcohols there is a rearrangement of ether radicals and the formation of a mixture of phosphates. Polyfluorotrialkyl phosphates are not decomposed by hydrogen chloride even during prolonged heating. This made it possible to check the catalytic activity of metal salts in the phosphorylation of polyfluorinated alcohols. Many salts of metals of groups I-III of the periodic system are effective catalysts. The catalytic effect was studied in detail by the authors in the phosphorylation of 1,1-dihydroperfluorobutyl alcohol with phosphorus oxychloride. Salts of

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ZAKHAROV, L. S., et al., Izvestiya Akademii Nauk SSSR, Seriya Khimicheskaya, No 11, Nov 71, pp 2503-2509

group II metals are the most effective catalysts, with CaCl_2 and Mg the most convenient preparation-wise. Salts of group I metals are not as effective as salts of group II metals, but they can be used for preparative purposes (ammonium salts). It is suggested as a mechanism for the catalytic phosphorylation of polyfluorinated alcohols that nucleophilic attack on the phosphorus oxychloride molecule is facilitated as a result of the interaction of catalyst with phosphoryl group. A series of symmetric polyfluoroalkyl phosphates and arylpolyfluoroalkyl phosphates were synthesized by using the catalytic method devised for the phosphorylation of polyfluorinated alcohols.

Analysis of all the resultant compounds was performed at the Micro-analysis Laboratory by TM. SHANINA, T. S. SEREBRYAKOVA and N. I. LARINA, whom the authors thank. The authors also thank A. G. OSHUYEV, YE. K. TSIRUL' and N. P. ANTONOVA for providing the specimens of polyfluorinated alcohols.

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USSR

UDC 542.91:661.718.1

KOVTUN, V. YU., GILYAROV, V. A., and KARACHNIK, M. I., Institute of Metal-organic Compounds, Academy of Sciences USSR

"Some Properties of Tetraphenylmethylenediphosphinedi(N-phenylimine)"

Moscow, Izvestiya Akademii Nauk SSSR, Seriya Khimicheskaya, No 10, Oct 71, pp 2217-2221

Abstract: Treating phenylazide with tetraphenylmethylenediphosphine or tetraphenylethylenediphosphine by the method of Shtaundinger yields tetraphenylmethylenediphosphinedi-(N-phenylimine) (I) and tetraphenylethylenediphosphinedi-(N-phenylimine) (II) respectively. These two compounds differ substantially in their properties. Treating (I) with excess methyl iodide leads to the formation of monomethyl iodide (II) while under analogous conditions (II) gives dimethyl iodide (IV). Hydrolysis of (III) followed by separation of the amine showed a 1:1 ratio of N-methylamine:aniline, indicating that only one phosphineimine group was alkylated in (I). Refluxing (I) with aromatic aldehydes in xylene produces tetraphenylethylenediphosphine (V). Treating (I) with excess metallic sodium or butyllithium in tetrahydrofuran leads to the replacement of one hydrogen atom on the methylene group. Metallic derivatives of (I) react with CH_3I in tetrahydrofuran yielding diphenyl- $\frac{1}{2}$

USSR

KOVTUN, V. YU., et al., Izvestiya Akademii Nauk SSSR, Seriya Khimicheskaya,
No 10, Oct 71, pp 2217-2221

[N-methyl-N'-phenylamino]-[diphenyl(N'-methyl-N'-phenyl)aminophosphorani-
lidene]methylphosphonium iodide.

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UDC 547.241.07

USSR

KABACHNIK, M. I., MEDVED', T. Ya., LASTOVSKIY, R. P., KOLPAKOVA, I. D.,
~~URINOVICH, Ye. M.~~, KRINITSKAYA, L. V., and MIRONOVA, Ye. I.

"A Method of Making Hydroxyethylidenediphosphonic Acid"

Moscow, Otkrytiya, izobreteniya, promyshlennyye obraztsy, tovarnyye znaki,
No 5, Feb 71, Author's Certificate No 292984, Division C, filed 2 Jun 69,
published 15 Jan 71, p 101

Translation: This Author's Certificate introduces: 1. A method of making hydroxyethylidenediphosphonic acid by interacting phosphorus trichloride with acetic acid in the presence of heat. As a distinguishing feature of the patent, the process is simplified by adding acetic anhydride to the initial mixture. 2. A modification of this method distinguished by the fact that the phosphorus trichloride, acetic acid and acetic anhydride are present in the mixture in a molar ratio of 1:2:1. 3. A modification of this method in which the process is carried out at a temperature of 35-120°C.

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UDC 547.241

USSR

PETROV, E. S., TSVETKOV, Ye. N., KABACHNIK, M. I. and SHATENSHTEYN, A. I.,
Institute of Physical Chemistry imeni L. Ya. Karpov and Institute of Elemento-
Organic Compounds, Academy of Science SSSR

"Equilibrium CH-Acidity of Some Phosphine Oxides"

Leningrad, Zhurnal Obshchey Khimii, Vol 41, No 5, May 1971, p 1172

Abstract: In studying the equilibrium CH-acidity of organophosphorus compounds, spectrophotometry was used to determine the equilibrium constants (K) at 25° for the following reactions conducted in diethylene glycol solutions: diphenylbenzylphosphine oxide (I) with fluorenyl lithium, and diphenylmethyl phosphine oxide (II) and phenyldimethyl phosphine oxide (III) with triphenylmethyl lithium. The pK_a was calculated from this data.

	K	pK_a
$(C_6H_5)_2P(O)CH_2C_6H_5$ (I)	2.1 ± 0.3 (7)	22.5
$(C_6H_5)_2P(O)CH_2$ (II)	14 ± 10 (6)	31.3
$C_6H_5P(O)(CH_3)_2$ (III)	6 ± 0.6 (4)	31.7

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USSR

PETROV, E. S., et al., Zhurnal Obshchey Khimii, Vol 41, No 5, May 1971, p 1172

A comparison of the acidities (I and II) with those of toluene and methane shows that the acidifying effect of the diphenyl phosphinoxy group is 9-10 pK_a units. A comparison of II and III shows that a substituent on the phosphorus atom (CH_3- and C_6H_5-), has little effect.

2/2

USSR

UDC 547.26'118

MASTRYUKOVA, T. A., SAKHAROVA, T. B., and KABACHNIK, M. I., Institute of Heteroorganic Compounds, Academy of Sciences USSR

"Benzoylation of Ammonium Diethyl Thiophosphate"

Leningrad, Zhurnal Obshchey Khimii, Vol 41, No 1, Jan 71, p 239

Abstract: V. G. PESIN and I. G. VITENBERG previously reported the S-benzoylation of ammonium diethyl thiophosphate with benzoyl- and p-nitrobenzoyl chlorides. This contradicted an earlier finding by the authors of the present article concerning O-acetylation of ambident dialkyl thiophosphate anions. The authors carefully studied the structure of the substances obtained by PESIN and found them to be O-benzoyl derivatives.

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USSR

UDC 547.26'418

GENKINA, G. K., KOROLEV, B. A., GILYAROV, V. A. and KABACHNIK, M. I., Institute of Metalloorganic Compounds, Academy of Sciences USSR, and All-Union Scientific Research Institute of Organic Intermediates and Dyes

"Basicity of Some Phosphorus Acid Imides"

Leningrad, Zhurnal Obshchey Khimii, Vol 41, No 1, Jan 71, pp 80-84

Abstract: The authors determined the basicity of a series of phosphorus acid imides of the type $XYZP = NC_6H_4R$ ($R = H, p-F$; $X, Y, Z = Alk, AlkO, Ar, NR_2$) by potentiometric titration in nitromethane with perchloric acid and studied the effect of substituents at the phosphorus atom on the strength of these substances as bases. The pK_a values of the investigated phosphorus acid imides show that they are all strong bases (pK_a from 13.4 to 19.7). The values depend on the nature of the substituents X, Y and Z , they obey the Hammett equation, using the constants σ_ϕ of the groups X, Y, Z .

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USSR

UDC 543.42+541.6:661.718.1

MATROSOV, Ye. I., GILYAROV, V. A., KOVTUN, V. Yu., and KABACHNIK, M. I.,
Institute of Heteroorganic Compounds, Academy of Sciences USSR

"Spectra and Structure of Salts of Triphenylphosphine-N-phenylimine and Its
Complexes with Phenols"

Moscow, Izvestiya Akademii Nauk SSSR, Seriya Khimicheskaya, No 6, Jun 71,
pp 1162-1168

Abstract: The authors studied IR spectra of halomethylates and the hydro-
bromide of triphenylphosphine-N-phenylimine and its complexes with phenol,
p-bromophenol and pentachlorophenol. On the basis of the resultant spectral
data the structure of phosphinimine salts can be characterized as mesomeric
with a pronounced phosphonium structure. The interaction of phosphinimine with
phenol and p-bromophenol gives complexes with a hydrogen bond of the composi-
tion 1:1, isolated in crystalline form. Spectral data on the pentachlorophenol-
phosphinimine complex indicate a strong acid-base interaction which apparently
results in protonation of the phosphinimine molecule.

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UDC 543.422.4:661.718.1

USSR

MATROSOV, YE. I., MEDVED', T. YA., and ~~KABACHNIK, M. I.~~ Institute of Element-Organic Compounds, Academy of Sciences USSR

"Infrared Spectra of Substituted Tetraphenylmethylenediphosphine Dioxides"

Moscow, Izvestiya Akademii Nauk SSSR, Seriya Khimicheskaya, No 5, 1971, pp 1094-1096

Abstract: Infrared spectra of the dioxides of tetraphenylmethylenediphosphine substituted in the methylene bridge $[\text{Ph}_2\text{P}(\text{O})]_2\text{CHR}$ revealed interesting behavior of the bands corresponding to the absorption of the P=O and C-H groups. Evidently, in the compounds investigated the multiplet status of the vibrational bands of the P=O groups is due mainly to their participation in intermolecular hydrogen bonding with the hydrogen atoms of the methylene bridge of the neighboring molecule. Thus, the ability of C-H bridging groups in methylene dioxides to form hydrogen bonds was discovered. This is in close agreement with the lability of the hydrogen atom in these groups in presence of organic bases. Capability of forming hydrogen bonds is shown by methylene groups of the oxide of diphenylphenacylphosphine $\text{Ph}_2\text{P}(\text{O})\text{CH}_2\text{C}(\text{O})\text{Ph}$ in whose spectra intense vibrational bands of the C-H groups were detected at 2920 and 2800 cm^{-1} .

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USSR

UDC 547.241

MIRONOVA, Z. N., TSVETKOV, Ye. N., NIKOLAYEV, A. V., and KABACHNIK, M. I.,
Institute of Inorganic Chemistry, Siberian Branch of the Academy of
Sciences, USSR and Institute of Metalorganic Compounds, Academy of
Sciences, USSR

"Syntheses Based on Tetra(hydroxymethyl)phosphonium Chloride"

Leningrad, Zhurnal Obshchey Khimii, Vol 43 (105), No 3, Mar 73, pp 534-538

Abstract: Reaction of tri(chloromethyl)phosphine with alkoxides of higher alcohols yields the oxides of methyldi(alkoxymethyl)phosphine which are effective extracting agents for uranium and thorium salts from sulfate solutions. It has been shown that the oxide of methyldi(methoxymethyl)-phosphine reacts with potassium hydroxide at about 150°C splitting along the phosphorus-carbon bond to yield methylmethoxymethylphosphinic acid. Higher homologues split at 200-250° forming the respective methylalkyl ether and a salt of methylalkoxymethylphosphinic acid. The acids were isolated in form of benzhydrylammonium salts.

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UDC 547.26'118

USSR

GODOVIKOV, N. N., GUDRALIYEV, Kh. Kh., and KABACHNIK, M. I., Institute of Organoelemental Compounds, Academy of Sciences USSR

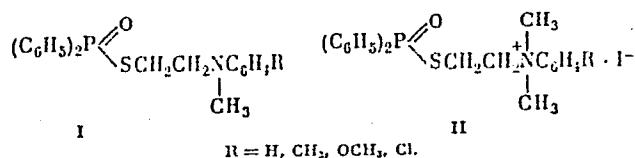
"Synthesis of S-(β -Arylmethylaminoethyl) Diphenylthiophosphinates and Their Methiodides"

Leningrad, Zhurnal Obshchey Khimii, Sep 71, Vol 41, No 9, pp 1942-1944

Abstract: Earlier research indicates that some 0,0-diethyl S-(β -arylmethylaminoethyl) thiophosphates and their methyl sulfates possess selective activity toward butyrylcholine esterase. The purpose of this study was to determine whether such selective action would be reflected in similar triphosphates having (at the phosphorus atom) bulky substituents such as phenyl groups. To this end a synthesis was carried out of the series S-(β -arylmethylaminoethyl) diphenylthiophosphinates (I) and their methiodides (II)

USSR

GODOVIKOV, N. N., et al., Zhurnal Obshchey Khimii, Sep 71, Vol 41, No 9, pp 1942-1944



Compounds (I) were obtained by treatment of N-methyl-N-β-bromo(chloro)-ethylarylamines with sodium diphenylthiophosphinate. To increase yields, use was made of bromoderivatives (in most cases); the yields of the corresponding thioesters were 70-80%. The obtained compounds were boiled in nitromethane with excess methyl iodide to form the appropriate methiodides (II). The experimental portion of the synthesis of N-methyl-N-β-bromomethyl-m-chloroaniline, S-(β-arylmethylaminoethyl) diphenylthiophosphinates and methiodides of S-(β-arylmethylaminoethyl) diphenylthiophosphinates is described in great detail. Tables citing constant values, yields and other analytical results are given.

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USSR

UDC 547.26'118

KARDANOV, N. A., GODOVIKOV, N. N., and KABACHNIK, M. I., Institute of Element-Organic Compounds, Academy of Sciences USSR

"Synthesis of O- ω -Ethylmercaptoalkyl Diphenylphosphinates and Their Methiodides"

Leningrad, Zhurnal Obshchey Khimii, Vol 41 (103), No 2, Feb 71, pp 327-330

Abstract: In an attempt to prepare compounds with cholinolytic action a series of O- ω -ethylmercaptoalkyl diphenylphosphinate methiodides (I) was synthesized by the reaction of diphenylphosphinyl chloride with ω -hydroxy ethyl sulfides (II) in presence of triethylamine. The intermediate O- ω -ethylmercaptoalkyl diphenylphosphinates were then treated with methyl iodide to give (I). Several routes were used to get the starting (II): γ -hydroxypropyl-ethyl sulfide was synthesized by addition of ethyl mercaptan to allyl alcohol in presence of benzoyl peroxide; the delta-hydroxybutyl homolog was obtained by reaction of δ -chlorobutanol with sodium ethylmercaptide. To synthesize ϵ -hydroxypentyl- and hydroxyhexyl ethyl sulfides ω -bromoalkyl benzoate was allowed to react with potassium methyl-mercaptide, followed by saponification. No biological data are reported.

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USSR

UDC 542.91 + 661.718.1

MALAKHOVA, I. G., TSVETKOV, YE. N., and KABACHNIK, M. I., Institute of Element-Organic Compounds, Academy of Sciences USSR.

"m- and p-Carbethoxyphenyldichlorophosphines"

Moscow, Izvestiya Akademii Nauk SSSR, Seriya Khimicheskaya, No 11, Nov 70, pp 2602-2603

Abstract: m- and p-Carbethoxyphenyldichlorophosphines were synthesized by the reaction of m- and p-carbethoxyphenyldiazonium borofluorides with phosphorus trichloride in the presence of Cu_2Br_2 with subsequent reduction of the resultant complex compounds with magnesium. For purification the carbethoxyphenyldichlorophosphines were hydrolyzed to the corresponding phosphonous acids, which after recrystallization were converted to the initial dichlorophosphines by the action of PCl_3 . Oxidation of the dichlorophosphines with sulfur chloride in CCl_4 gives corresponding m- and p-carbethoxyphenylphosphonic acid dichlorides.

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USSR

UNC 547.241

TSVETKOV, Ye. N., and KABACHNIK, M. I., Institute of Element-Organic Compounds,
Academy of Sciences USSR, Moscow

"Conjugation in the Trivalent Phosphorus Series of Compounds"

Moscow, Uspekhi Khimii, Vol 40, No. 2, Feb 71, pp 177-225

Abstract: A review with 361 references. Trivalent phosphorus is usually considered as an analog of trivalent nitrogen with respect to its electronic effects. Recently it has been shown however that trivalent phosphorus containing substituents exhibit no π -donor effect which to some degree is typical of II or III period elements with unshared pairs of electrons. The trivalent phosphorus substituents manifest a π -acceptor effect, characteristic of the metaorienting groups, which is due to the interaction with vacant orbitals in the phosphorus atom. Trivalent phosphorus is thus incapable of $p-\pi$ -conjugation in contrast to other II and III period elements with unshared electron pairs. The inability of the unshared pair in phosphorus to delocalize is due to its higher S-character; this is supported by the bond angles of its compounds. Physical and chemical properties of these compounds have been reviewed giving support to the hypothesis on the predominant S-character of unshared electron pair in trivalent phosphorus.

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USSR

UDC 66.095.25 + 661.718.1

POLIKARPOV, YU. M., KULUMBETOVA, K. ZH., MEDVED', T. YA.,
~~KABACHNIK, M. I.~~, Institute of Organo Elemental Compounds, Moscow,
 Academy of Sciences USSR

"Alkylation of Tetraphenylmethylenediphosphine Dioxide"

Moscow, Izvestiya Akademii Nauk SSSR, Seriya Khimicheskaya, No 6,
 Jun 70, pp 1326-1329

Abstract: Alkylation of the potassium salt of tetraphenylmethylenediphosphine dioxide (I) with alkyl halides in boiling xylene gave a series of tetraphenyl-(R)-alkylenediphosphine dioxides (R derivative and m.p. in °C are reported): C_2H_5- , 257-258; C_4H_9- , 204-206; $C_6H_{13}-$, 172-173; $C_{12}H_{25}-$, 116-118; $C_6H_5CH_2-$, 217-218. In a similar fashion (I) and CH_2Br_2 gave tetraphenylmethylenediphosphine dioxide and its vinylidene homologue, m.p. 197-199°; 1,6-dibromohexane and (I) gave oxaphenylhexamethylenetetraphosphine tetroxide, m.p. 302-304°, while the p-xylylenedibromide yielded octaphenyl-p-xylylenetetraphosphine tetroxide, m.p. 324-325°, and 1,5-dibromopentane gave tetraphenylcyclohexylenediphosphine dioxide, m.p. 254-255°.

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USSR

UDC 547.593.1

YAKOVLEV, YE. A., ISAYEVA, G. G., MYKHEVICH, M. M., KUPCHENKO, A. M.,
TSVETKOV, YE. N., KADACHUK, M. I., and SHVACHKIN, A. I., *Physicochemical*
Institute named *L. P. Karpov* and Institute of Organoelemental Compounds,
Academy of Sciences USSR

"Partial Rate Factors for Protophilic Deuterioexchange of Dimethylphosphine
with Liquid Ammonia under Potassium Amide Catalysis"

Leningrad, *Zhurnal Obshchey Khimii*, Vol. 40, No 7, Jul 70, pp 1626-1631

Abstract: The authors undertook to determine the partial rate factors for
deuterioexchange with liquid ammonia (KML , catalyst, 25°) for all ring positions
of dimethylphosphine. The deuterated dimethylphosphines were synthesized by the
reaction of the corresponding organomagnesium compounds with dimethylphosphinic
chloride and subsequent reaction of the resultant oxides with siliconchloro-
form. The structure of the isomers was confirmed by IR spectra. The partial
rate factors were calculated on the basis of measurements of the deuterioexchange
reaction rate constants for dimethyl-o-m-, and p-deuterioethylphosphine.

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USSR

YAKOVLEVA, Ye. A., et al., Zhurnal Obshchey Khimii, Vol 40, No 7, Jul 70,
pp 1626-1631

Approximate comparative data were also obtained on the protophilic deuteriation rates for dimethyl-m- and p-trideuteriotolylphosphines. The results indicated that the $(CH_3)_2P$ group was an electron acceptor in the reaction of protophilic isotopic hydrogen exchange with a strong base.

2/2

UDC 547.29.118.07

USSR

TSVETKOV, YE. N., MALEVANNAYA, R. A., OSIPENKO, N. G., and KABA-
CHNIK, M. I., Institute of Organo Elemental Compounds, Moscow,
Academy of Sciences USSR

"A Method of Producing Phosphinylcarboxylic Acids"

Moscow, Otkrytiya, Izobrenteniya, Promyshlennyye Obraztsy,
Tovarnyye Znaki, No 17, 1970, Author's Certificate No 270730,
filed 29 May 68, p 23

Abstract: This Author's Certificate introduces a method of pro-
ducing phosphinylcarboxylic acids except for α -phosphonylacetic
acid. As a distinguishing feature of the patent, salts of tri-
valent phosphorus acids are intreacted with salts of halocarboxy-
lic acids, except acetic, in the presence of heat with sub-
sequent isolation of the goal product by conventional methods,

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USSR

UDC Not given

KABACHNIK, M. I., GODOVIKOV, N. N., PISARENKO, V. V., ZAKHAROV,
L. S., "Order of Lenin" Institute of Organo Elemental Compounds,
Moscow, Academy of Sciences USSR

"A Method of Producing Polyfluoroalkyldichlorophosphates"

Moscow, Otkrytiya, Izobreteniya, Promyshlennyye Obraztsy, Tovarnyye
Zanki, No 18, 1970, Author's Certificate No 271518, filed 13 Mar
69, p 24

Abstract: This Author's Certificate introduces: 1. A method of
obtaining polyfluoroalkyldichlorophosphates by interacting poly-
fluoroalkyl alcohol with phosphoryl chloride in the presence of
heat. As a distinguishing feature of the patent, the process is
simplified by carrying out the reaction in the presence of chlorides
of metals in groups I, II and III of the periodic table.
2. The method described in (1) is distinguished by the fact that
the phosphoryl chloride and polyfluoroalkyl alcohol are used in
a ratio of 5:1, the process is carried out at a temperature
of 70-120°C.

UDC 541.454 : 546 : 185

USSR

GENKINA, G. K., GILYAROV, V. A., MATROSOV, YE. I., and KABACHNIK, M. I., Institute of Organoelemental Compounds, Academy of Sciences USSR

"Study of Imide-Amide Rearrangement of Some Phosphorus Acid Imides Under the Action of Alkyl Halides"

Leningrad, Zhurnal Obshchey Khimii, Vol 40, No 7, Jul 70, pp 1496-1501

Abstract: The authors made a kinetic study of the imide-amide rearrangement of imides of phosphorus acids under the action of ethyl iodide in acetonitrile at 50° and its dependence on the character of the substituents at the phosphorus atom. It was found that the rearrangement rate strongly depends on the substituents. There is a linear correlation between the logarithms of the rearrangement rate

constants and $\sum \sigma_p$ of the substituents at the phosphorus atom.

Some imides of phosphorus acids of the general type $AB(C_2H_5O)P=NC_6H_5$

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USSR

GENKINA, G. K., et al., Zhurnal Obshchey Khimii, Vol 40, No 7, Jul 70, pp 1496-1501

and amides of phosphorus atoms of the general type $ABP(O)N(C_2H_5)C_6H_5$ were synthesized. Chromatographic analysis was performed by S. YE. CHESNOKOVA and IR spectra taken by B. S. CHIKIL'DIN and M. I. VOLKOVA.

2/2

Biochemistry

USSR

KABACHNIK, M. I., Academician, and GOLOVIKOV, K. N., Institute of Heteroorganic Compounds, Academy of Sciences USSR, Moscow

"Role of Ionic Interactions in Cholinesterase Inhibition"

Moscow, Doklady Akademii Nauk SSSR, Vol 196, No 2, 1971, pp 348-351

Abstract: The rate constants for cholinesterase inhibition under the action of organophosphorus inhibitors (OPI) carrying a positive charge are related to the reaction rate constants for inhibitors of the same structure, but without a charge, by the equation

$$\log k_{II}^+ = \log k_{II}^0 + \frac{r^2}{2.3kTDr} + \Delta \log K,$$

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USSR

KABACHNIK, N. I., and GODOVICOV, N. N., Doklady Akademii Nauk
SSSR, Vol 196, No 2, 1971, pp 348-351

where $\Delta \log k'$ is the difference between the constants k' for a charged and uncharged OPI molecule. The sorption of an inhibitor on the active surface of butyryl cholinesterase is determined mainly by hydrophobic interactions, and the appearance of a cation group in the inhibitor promotes the inhibition process, first of all by increasing the electrophilic reactivity of the OPI and to a lesser extent through the effect of ionic vapor formation (with the conformation of the active surface preserved). In the case of acetylcholinesterase inhibition a sharper increase in the inhibition rate with the appearance of a positive charge in the OPI molecule takes place than can be attributed only to ion pair formation or increased electrophilic reactivity of the OPI. It can be assumed that conformational changes in the enzyme play a much larger role here. The substrate specificity of AChE and nonspecificity of BuChE may be due to this difference.

2/2

173 015 UNCLASSIFIED PROCESSING DATE--18SEP70
TITLE--SYNTHESES BASED ON TETRAMETHYLOLPHOSPHONIUM CHLORIDE. SOME
TRANSFORMATIONS OF TRIS(CHLOROMETHYL)PHOSPHINE AND
AUTHOR--(05)-TSVETHKOV, YE.N., BORISOV, G., SIVRIYEV, KH., MALEYANNAVA,
R.A., KABACHNIK, M.I.
COUNTRY OF INFO--USSR
SOURCE--ZH. OBSHCH. KHIM. 1970, 40(2) 285-91
DATE PUBLISHED-----70
SUBJECT AREAS--CHEMISTRY
TOPIC TAGS--CHEMICAL SYNTHESIS, ORGANIC PHOSPHORUS COMPOUND, CHLORINATED
ORGANIC COMPOUND, THIOL
CONTROL MARKING--NO RESTRICTIONS
DOCUMENT CLASS--UNCLASSIFIED
PROXY REEL/FRA--1985/1397 STEP NO--UR/0079/70/040/002/0285/0291
CIRC ACCESSION NO--AP0101489
UNCLASSIFIED

UNCLASSIFIED

PROCESSING DATE--18SEP70

2/3 015

CIRC ACCESSION NO--AP0101489

ABSTRACT/EXTRACT--(U) GP-0-

ABSTRACT. ADDN. OF 350 G (HOCH SUB2) SUB4
PCL TO 1680 G PCL SUB5 IN 2 1. CCL SUB4 AT REFLUX AND HEATING 4 HR GAVE
97PERCENT (CLCH SUB2) SUB4 PCL (I), M. 198 TO 9DEGREES. I (200 G)
TREATED WITH 60.7 G NAOH IN 300 ML H SUB2 O AT 10 TO 15DEGREES IN 400 ML
H SUB2 O TO 400 ML CHCL SUB3 UNTIL ALK. TO PHENOLPHTHALEIN, GAVE
81.5PERCENT (CLCH SUB2) SUB3 P (II), B SUB2 56 TO 7DEGREES, D PRIME20
2.4204, N PRIME20 D 1.5530, WHICH ON STANDING DEPOSITED A FLAKY
COLORLESS SOLID OF UNDET. COMPN.; DURING EVAPN. OF THE SOLVENT FROM II
THE TEMP. MUST BE HELD UNDER 90DEGREES AS EXPLOSIONS OCCURED AT
100DEGREES OR HIGHER. II AND 24PERCENT NAOH AT 10 TO 20DEGREES THEN AT
REFLUX 3 HR UNTIL HOMOGENEOUS GAVE MEP(O)(CH SUB2 CL) SUB2 (III), B SUB7
149 TO 50DEGREES, M. 49 TO 50 DEGREES. III ALSO-FORMED AFTER SIMILAR
HEATING OF II WITH H SUB2 O ALONE. HEATED WITH NADAC ACOH 6 HR AT
200DEGREES III GAVE THE DIACETATE, B SUB5 163 TO 4DEGREES, 1.2326,
1.4670. ALSO PREPD. FROM II AND ACOH ACONA 10 HR AT 150DEGREES. HEATING
II WITH ETSH ETSNA 9 HR AT 130DEGREES IN ET SUB2 O IN AN AUTOCLAVE GAVE
84PERCENT (ETSCH SUB2) SUB3 P, B SUB2 137 TO 8DEGREES, 1.0749, 1.5665.
MEP(O) (CH SUB2 CL) SUB2 (IV) AND ET SUB2 NH IN 15 HR AT 125DEGREES GAVE
49PERCENT MEP(O)(CH SUB2 NET SUB2) SUB2, B SUB2 TIMES SUB5 118 TO
190DEGREES, 0.9391, 1.4681.

UNCLASSIFIED

UNCLASSIFIED

PROCESSING DATE--18SEP70

3/3 015

CIRC ACCESSION NO--AP0101489

ABSTRACT/EXTRACT--HEATING 3 G IV AND 10 G PH SUB3 P IN ME SUB2 NCHO 12 HR
AT 150 TO 60DEGREES GAVE ON ADDN. OF ME SUB2 CO 67.5PERCENT (PH SUB3 PCH
SUB2)SUB2 P(O)ME PRIME POSITIVE PRIME POSITIVE2 CL PRIME NEGATIVE, M.
300 TO 1.5DEGREES. IV (4G) IN MEPH AND A REACTION PRODUCT OF 1.37 G NA
AND 10 ML MEQCH SUB2 CH SUB2 OH IN MEPH GAVE IN 6 HR REFLUXING
53.5PERCENT MEP(O)(CH SUB2 OCH SUB2 CH SUB2 OME) SUB2 B SUB5 185 TO
6DEGREES, 1.1117, 1.4625. SIMILARLY WAS PREPD. 52PERCENT MEP (O) (CH
SUB2 OCH SUB2 CH SUB2 OBU) SUB2, B SUB5 210 TO 11.5DEGREES, 1.0082;
1.4547. PHONA SIMILARLY GAVE 83PERCENT MEP(O)(CH SUB2 OPH) SUB2, M. 96
TO 7 DEGREES. SIMILARLY WAS PREPD. 80PERCENT P TOLYL ANALOG, M. 122 TO
4DEGREES; 79PERCENT P NITROPHENYL ANALOG, M. 169 TO 70DEGREES; M
NITROPHENYL ANALOG, M. 90 TO 1DEGREES; P CARBO METHOXYPHENYL ANALOG, M.
133 TO 5DEGREES; P CARBONYPHENYL ANALOG, M. 295 TO 60DEGREES; M ISOMER,
M. 142 TO 3 DEGREES.

UNCLASSIFIED

USSR

UDC: 547.558.1

TSVETKOV, Ye. N., MAKHAMATKHANOV, M. M., LOBANOV, D. I., and KABACHNIK, M. I.,
Institute of Organoelemental Compounds, Academy of Sciences of the USSR

"Electronic Effect of Phosphorus-Containing Substituents. Constants σ_m of
Diphenylphosphino-, Diphenylphosphinyl and Diphenylthiophosphinyl Groups"

Leningrad, Zhurnal Obshchey Khimii, Vol 40 (102), No 11, Nov 70, pp 2387-2390

Abstract: This paper is a continuation of research on synthesis of phosphorus-containing phenols and determination of their ionization constants. The constants σ_m are calculated for the $(C_6H_5)_2P^-$, $(C_6H_5)_2P(O)^-$ and $(C_6H_5)_2P(S)^-$ groups by using the ionization constants of the corresponding meta-substituted phenols. The phosphorus-containing phenols -- m-diphenylphosphino-, m-diphenylphosphinyl-, and m-diphenylthio-phosphinylphenols -- were synthesized by Lamza's method (J. pr. Chem., 25, p 294, 1964). The ionization constants of these phenols were determined by potentiometric titration in a water-alcohol mixture (1:1 by volume) at 25°C. The constants σ_m were then calculated by a previously derived formula. The results are tabulated.

1/1

USSR

UDC: 632.95

KABACHNIK, M. I., MASTRYUKOVA, T. A., SHIPOV, A. E., ANDRIANOVA, L. V.,
VARSHAVSKIY, S. L., and KOPMAN, L. P.

"A Method for Preparing N-Acyl-S-(o-Alkylmethylthiophosphonyl) Cysteine Ester
Derivatives"

USSR Author's Certificate No 253063, filed 18 July 68, published 3 Apr 70 (from
RZh-Khimiya, No 22, 25 Nov 70, Abstract No 22 N650 P by G. V. Kusnetsova)

Translation: The indicated substances with the general formula $\text{ROPMe(S)SCH}_2\text{-CH(NH-COR')COOR''}$ (I) (R, R' and R'' = alkyls) are obtained from the reaction² of ROPMe(S)Cl with $\text{HSCH}_2\text{CH(NHCOR')COOR''}$ in an organic solvent medium in the presence of an HCL acceptor. A solution of 1,7 g of iso-PrOPMe(S)Cl in 10 ml of absolute C_6H_6 is added to a solution of 2 g of $\text{HSCH}_2\text{CH(NHAc)COOEt}$ and 1,1 g of Et_3N in 50 ml of absolute C_6H_6 in an inert gas atmosphere while being mixed. The mixture is stirred for 1 hour at $20-5^\circ$ and then at $50-5^\circ$. The precipitated Et_3N hydrochloride is filtered off and the filtrate washed with cold 2% Na_2CO_3 solution and water. The solution is evaporated and by chromatography on SiO_2 (hexane-acetone 3:2) 1.38 g (42.2%) of I (R=iso-Pr, R'=Me,

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USSR

KABACHNIK, M. I., et al, USSR Author's Certificate No 253063, filed 18 July 68, published 3 Apr 70 (from RZh-Khimiya, No 22, 25 Nov 70, Abstract No 22 N650 P by G. V. Kusnetsova)

R'=Et): $C_{11}H_{22}NO_4PS_2$, is obtained. The next I (R'=Me; R, R'', yield in %, d_{20}^{25} , and n_D^{20} are given) is prepared in a similar fashion: Me, Me, 42.6, 1.2446, 1.5296; Me, Et, 48.7, 1.2068, 1.5210; Me, iso-Pr, 66.8, 1.1694, 1.5108; Et, Me, 40.5, 1.2041, 1.5152; Et, Et, 51.5, 1.1780, 1.5138; Et, iso-Pr, 23.5, 1.1608, 1.5082; Pr, Me, 54.4, 1.1948, 1.5151; Pr, Et, 38.3, 1.1477, 1.5050; Pr, Pr, 45.2, 1.1497, 1.5140; Pr, iso-Pr, 1.1490, 1.5069; iso-Pr, Me, 45, 1.1560, 1.5029; and iso-Pr, iso-Pr, 22.5, 1.1506, 1.4990. I can be used as physiologically active substances and as intermediate products in organic synthesis.

2/2

USSR

UDC 542.91 + 541.49 + 661.718.1

DYATLOVA, N. M., MEDVED', T. YA., RUDOMINO, M. V. and KABACHNIK, M. I., Institute of Organo-Elemental Compounds, Moscow, Academy of Sciences, USSR, and Institute of Chemical Reagents and Ultrapure Materials, State Committee for Chemistry

"Synthesis and Complexing Properties of Ethylenediaminobisarylmethylphosphinic Acids"

Moscow, Izvestiya Akademii Nauk SSSR, Seriya Khimicheskaya, Vol 4, Apr 70, pp 815-819

Abstract: The acids were obtained by condensation of monoethylester of methylphosphinic acid with Schiff bases of ethylenediamine and aromatic aldehydes in the presence of catalytic amounts of sodium ethoxide. With benzaldehyde, the ethyl ester of ethylenediaminobisbenzylmethylphosphinic acid is obtained as a dihydrochloride, which can be converted to the free acid by thermal self-saponification. When salicylaldehyde is used, the free acid is obtained directly. The yields were 42 and 20% respectively. Both acids are colorless crystalline compounds insoluble in water or organic solvents, soluble in dilute acids and bases. Analysis of three types
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USSR

DYATLOVA, N. M., et al, Moscow, Izvestiya Akademii Nauk SSSR, Seriya Khimicheskaya, Vol 4, Apr 70, pp 815-819

of materials, containing phosphinic, phosphonous and phosphonic groups showed that phosphonic groups exhibit strongest complexing properties. It was determined that ethylenediaminobis-o-hydroxy-benzylmethylphosphinic acid may be used for spectrophotometric determination of titanium (IV).

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- L7 -

USSR

UDC 541.623 661.718.1

KABACHNIK, M. I., GILYAROV, V. A., KOROLEV, B. A., and RAYEVSKAYA, T. A., Institute of Organo-Elemental Compounds, Moscow, Academy of Sciences USSR, and Scientific Research Institute for Organic Semi-Products and Dyes, Moscow, State Committee for Chemistry

"Tautomerism of P,P-Diethyl-N,N'-diarylphosphamidines"

Moscow, Izvestiya Akademii Nauk SSSR, Seriya Khimicheskaya, Vol 4, Apr 70, pp 772-780

Abstract: This study is concerned with quantitative investigation of tautomeric relationship of phosphamidines in a nitromethane solution. The phosphamidines were obtained by reacting diethylchlorophosphine with substituted anilines in the presence of triethylamine, yielding P,P-diethylanilidophosphinites, which when reacted with substituted phenylazides in benzene at 50-60° gave various phosphamidines. The basicity constants were determined for these compounds in nitromethane solution at $25 \pm 0.3^\circ$ by potentiometric titration: all were found to be strong bases in nitromethane solution. Tautomeric equilibrium constants were determined by three methods: "method of inter-

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USSR

KABACHNIK, M. I., et al, Izvestiya Akademii Nauk SSSR, Seriya Khimicheskaya, Vol 4, Apr 70, pp 772-780

secting lines" and by two methods of comparison of effective basicity of tautomeric compounds with that of corresponding methylated derivatives. All methods gave similar results. Donor substituents shift the equilibrium towards the form in which the proton would be fixed close to the donor substituent, while the opposite occurs with the acceptor substituents.

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USSR

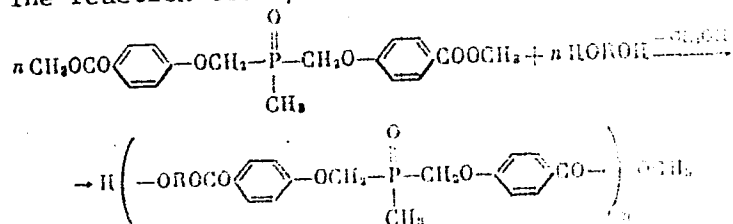
K UDC: 541.64:678.674:86

BORISOV, G., SIVRIYEV, KHR., TSVETKOV, YE. N., KARACHENIK, M. I., Institute of Organic Chemistry of the Bulgarian Academy of Sciences, Sofia; Institute of Organo Elemental Compounds, Moscow, Academy of Sciences USSR

"Synthesis of Polymers from Di-(4-carboxyphenoxyethyl)methylphosphine Oxide"

Moscow, Vysokomolekulyarnyye Soyedineniya, Vol XII, No 3, Mar 70, pp 620-625

Abstract: Polyesters were synthesized from di-(4-carboxyphenoxyethyl)-methylphosphine oxide and the following glycols: ethylene glycol, propylene glycol-1,2, n-butylene glycol-1,4, pentamethylene glycol, hexamethylene glycol and diethylene glycol. Ester exchange was carried out in the presence of zinc acetate as a catalyst in an excess of glycol in a purified nitrogen atmosphere. The reaction took place as follows:



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USSR

BORISOV, G., et al, Vysokomolekulyarnyye Soyedineniya, Vol XII, No 3, Mar 70, pp 620-625

The resultant polyesters in the fused state are semitransparent viscous substances. After reprecipitation, the compounds are colorless or yellowish powders. Fibers may be drawn from the melts, and the solutions produce excellent films. They are soluble in chloroform, dimethylformamide, cresol, and nitrobenzene. It was found that the melting point of the polyester decreased with an increase in the number of methylene groups in the glycol. The polyesters are fairly heat resistant, losing from 4 to 30% of their total weight when heated to 300°C for 3 hrs. It was also found that the thermal stability of the polyester decreases with an increase in the number of methylene groups in the glycol. The polyester products adhere well to glass and metal surfaces and will not burn when removed from an open flame.

2/2

- 107 -

USSR

UDC: 547.558.1

TSVETKOV, YE. N., MAKHAMATKHANOV, M. M., LOBANOV, D. I., and KABACHNIK, M. I., Institute of Organoelemental Compounds, Moscow, Academy of Sciences USSR

"Ionization Constants of m- and p-Dimethylphosphinophenols"

Leningrad, Zhurnal Obshchey Khimii, Vol 40, No 2, Feb 70, pp 500-501

Abstract: In connection with the study of p- π conjugation in trivalent phosphorus compounds, the authors prepared m- and p-dimethylphosphinophenol hydrobromides by dealkylation of the corresponding dimethylphosphinoanion-
soles with 48 percent hydrobromic acid. The ionization constants of the resultant compounds were determined by potentiometric titration in water at 25° in an argon current. m-Dimethylphosphinophenol hydrobromide: $pK_{a1} = 5.89 \pm 0.04$, $pK_{a2} = 9.66 \pm 0.04$. p-Dimethylphosphinophenol hydrobromide: $pK_{a1} = 6.75 \pm 0.04$, $pK_{a2} = 9.41 \pm 0.04$.

1/1

1/3 019 UNCLASSIFIED PROCESSING DATE--27NOV70
TITLE--TAUTOMERISM OF P,P DIETHYL N,N PRIME DIARYLPHOSPHAMIDINES -U-

AUTHOR--(04)--KABACHNIK, M.I., GILYAROV, V.A., KOROLEV, B.A., RAEVSKAYA,
T.A.
COUNTRY OF INFO--USSR *K*

SOURCE--IZV. AKAD. NAUK SSSR, SER. KHIM. 1970 (4), 772-80

DATE PUBLISHED-----70

SUBJECT AREAS--CHEMISTRY

TOPIC TAGS--TAUTOMERISM, ANILINE, TRIETHYLAMINE, ORGANIC PHOSPHORUS
COMPOUND, AMINE DERIVATIVE, POTENTIOMETRIC TITRATION, CHEMICAL SYNTHESIS

CONTROL MARKING--NO RESTRICTIONS

DOCUMENT CLASS--UNCLASSIFIED

PROXY REEL/FRAME--3006/1431

STEP NO--UR/0062/70/000/004/0772/0780

CIRC ACCESSION NO--AP0135103

UNCLASSIFIED

2/3 019

UNCLASSIFIED

PROCESSING DATE--27NOV70

CIRC ACCESSION NO--AP0135103

ABSTRACT/EXTRACT--(U) GP-0- ABSTRACT. ADDING 15.5 G ET SUB2 PCL TO 11.6 G PHNH SUB2 AND 13.86 G ET SUB3 N IN ET SUB2 O, AND KEEPING THE MIXT. OVERNIGHT GAVE 54PERCENT ET SUB2 PNHPH (I), B SUB0.1 70-10DEGREES, N PRIME20 SUB0 1.5628, D PRIME20 0.9979; SIMILARLY WERE PREPD. THE P ANISIDIDE, 32PERCENT, B SUB0.1 114-15DEGREES, 1.5619, 1.0494; AND P TOLUIDIDE, B SUB0.02 73-40DEGREES, 1.5573, 0.9718. I AND P AZIDOBENZO TRIFLUORIDE MIXED SLOWLY AT 50-60DEGREES IN PETROLEUM ETHER AND THE MIXT. HEATED 0.5 HR AT 50-60DEGREES GAVE ET SUB2 P[:NC SUB6 H SUB4 X]NHC SUB6 H SUB4 Y (X EQUALS P CF SUB3, Y EQUALS H), M. 156.5-57DEGREES. SIMILARLY WERE PREPD. THE ANALOGS (X AND Y SHOWN): P ME SUB2 N, H, M. 148-9DEGREES; P ME0, H, M. 148-8DEGREES; P F, H, M. 160-1DEGREES; M F, H, M. 153-4DEGREES; P CL, H, M. 147-8DEGREES; M NO SUB2, H, M. 116-17DEGREES; P NO SUB2, H, M. 131-2DEGREES; P CN, H, M. 131-2DEGREES; M F, P ME0, M. 112-13DEGREES; M CL, P ME, M. 134-50DEGREES; P CL, P ME0, M. 165-6DEGREES; P NO SUB2, P ME0, M. 143-4DEGREES; P CL, P ME, M. 163-3.5DEGREES; M F, P ME, M. 126-7DEGREES; P CF SUB3, P ME, M. 153-4DEGREES; M NO SUB2, P ME, M. 131-2DEGREES; AND P NO SUB2, P ME, M. 119-21DEGREES. FROM POTENTIOMETRIC TITRN. DATA OF THESE AMIDINES WITH HClO SUB4 IN MEND SUB2 THE CONCENTRATIONAL DISSOCN. CONSTS. OF THESE WERE CALCD. AND TABULATED AS PKA VALUES. FROM THESE BY THE METHOD OF INTERSECTING STRAIGHT LINES (K., ET AL., 1962) IT WAS POSSIBLE TO EST. THE TAUTOMERISM AMONG THESE AMIDINES. THE EQUIL. CONSTS. OF THE AMIDINES FOLLOW THE HAMMETT EQUATION AND CAN BE CALCD. FROM PK SUBF EQUALS 0.03 PLUS 1.793 SIGMA X WHERE SIGMA X IS THE SUBSTITUENT CONST.

UNCLASSIFIED

3/3 019

UNCLASSIFIED

PROCESSING DATE--27NOV70

CIRC ACCESSION NO--AP0135103

ABSTRACT/EXTRACT--THE BASICITIES OF THE AMIDINES WERE GENERALLY LOWER THAN THOSE OF METHYLATED DERIVS., OWING TO THE INDUCTIVE EFFECT OF THE ME GROUP IN THE LATTER. THE TAUTOMERIC EQUIL. CONSTS. FOR THE ABOVE AMIDINES WERE TABULATED ALONG WITH PKA VALUES. FACILITY: INST. ELEMENTORG. SOEDIN. MOSCOW, USSR.

UNCLASSIFIED

1/2 020 UNCLASSIFIED PROCESSING DATE--27NOV70
TITLE--SYNTHESIS AND COMPLEXING PROPERTIES OF ALPHA, LPHA PRIME N, N
PRIME, ETHYLENEDIAMINEBIS ALPHA ARYLMETHYLPHOSPHINIC ACIDS -U-
AUTHOR-(04)-DYATLOVA, N.M., MEDVED, T.YA., RUDOMINO, M.V., KABACHNIK, M.I.

COUNTRY OF INFO--USSR

SOURCE--IZV. AKAD. NAUK SSSR, SER. KHIM. 1970, (4), 815-19

DATE PUBLISHED-----70

SUBJECT AREAS--CHEMISTRY

TOPIC TAGS--ORGANIC SYNTHESIS, COMPLEX COMPOUND, SCHIFF BASE,
ETHYLENEDIAMINE, ORGANIC PHOSPHORUS COMPOUND, THERMAL DECOMPOSITION,
COPPER COMPLEX, NICKEL COMPLEX

CONTROL MARKING--NO RESTRICTIONS

DOCUMENT CLASS--UNCLASSIFIED

PROXY REEL/FRAME--3006/1474

STEP NO--UR/0062/70/000/004/0815/0819

CIRC ACCESSION NO--AP0135143

UNCLASSIFIED

2/2 020 UNCLASSIFIED PROCESSING DATE--27NOV70
 CIRC ACCESSION NO--AP0135143
 ABSTRACT/EXTRACT--(U) GP-0- ABSTRACT. HEATING 9.05 G SCHIFF BASE (PREPD. BY HEATING (CH SUB2 NH SUB2) SUB2 AND BZH AT 60DEGREES) WITH 8.3 G ME(0)(H)OET IN N ATM. 1.5 HR AT 70DEGREES IN THE PRESENCE OF A CATALYTIC AMT. ETONA ETOH GAVE AFTER TREATMENT AT 0DEGREES WITH DRY HCL IN DRY ET SUB2 O, 47.4PERCENT (CH SUB2 NHCHPHP(0), ME(OET)) SUB2.2HCL, DECOMPD. 134-8DEGREES; HEATED AT 145-55DEGREES TO 21.6PERCENT WT. LOSS, AND HEATING THE RESIDUE WITH H SUB2 O GAVE 42.5PERCENT (CH SUB2 NHCHPHP(0)ME(OH)) SUB2 (I), DECOMPD. 241-20DEGREES. SIMILAR REACTION WITH THE SCHIFF BASE FROM SALICYLALDEHYDE GAVE (CH SUB2, NHCHIC SUB6 H SUB4 OH,0)P(0)ME(OH)) SUB2 (II), DECOMPD. 223-4DEGREES. THESE ACIDS GAVE THE FOLLOWING VALUES OF THEIR RESP. PKA: I, 4.61 AND 7.84; AND II, 4.78, 7.55, 10.56 AND 11.58, FROM POTENTIOMETRIC TITRATION DATA. THE FOLLOWING STABILITY CONSTS. (LOG KAPPA) WERE CALCD. FROM TITRN. DATA WITH THE INDICATED METAL IONS, FOR THE COMPLEXES FORMED BY THE ACIDS WITH THE METALS: I; NI PRIME POSITIVE POSITIVE 6.91, CU PRIME POSITIVE POSITIVE 10.32; II; NI PRIME POSITIVE POSITIVE 7.06, 11.56, 15.39, MINUS, MINUS (FOR MH SUB2 X, MHX, MX, M(H SUB2 X) SUB2 AND MX SUB2 TYPES OF COMPLEXES, RESP.); CU PRIME POSITIVE POSITIVE 10.98, 16.74, 20.14, MINUS, MINUS; FE PRIME POSITIVE POSITIVE POSITIVE MINUS, MINUS, 31.25, MINUS, MINUS; AL PRIME POSITIVE POSITIVE POSITIVE MINUS, 15.36, GREATER THAN 20, MINUS, MINUS; AND TIO PRIME POSITIVE POSITIVE POSITIVE, 8.46, OVER 15. T(IV) CAN BE DETD. BY MEANS OF II AS A COMPLEXING AGENT, THROUGH SPECTROPHOTOMETRY OF THE COMPLEX. FACILITY: INST. ELEMENTORG. SOEDIN., MOSCOW, USSR.

UNCLASSIFIED

1/2 017 UNCLASSIFIED PROCESSING DATE--11SEP70
TITLE--NUCLEOPHILIC CONSTANTS OF SOME GROUPS CONTAINING PHOSPHORUS (V) -U-
AUTHOR--TSVETKOV, YE.N., MAKHAMATKHANOV, M.M., LOBANOV, O.I., KABACHNIK,
M.I.
COUNTRY OF INFO--USSR
SOURCE--IZV. AKAD. NAUK SSSR, SER. KHIM. 1970, (1), 178-80
DATE PUBLISHED-----70
SUBJECT AREAS--CHEMISTRY
TOPIC TAGS--OXIDATION, ORGANIC PHOSPHORUS COMPOUND, PHOSPHINE SULFIDE,
POTENTIOMETRIC TITRATION
CONTROL MARKING--NO RESTRICTIONS
DOCUMENT CLASS--UNCLASSIFIED
PROXY REEL/FRAHE--1984/1667 STEP NO--UR/0052/70/000/001/0178/0180
CIRC ACCESSION NO--AP0100271
UNCLASSIFIED

2/2 017

UNCLASSIFIED

PROCESSING DATE--11SEP70

CIRC ACCESSION NO--AP0100271

ABSTRACT/EXTRACT--(U) GP-0- ABSTRACT. OXIDN. OF APPROPRIATE PHOSPHINES WITH H SUB2 O SUB2 OR ADDN. OF S TO THESE GAVE THE FOLLOWING XC SUB6 H SUB4 OH (X, M.P., PKA AND HAMMETT SUBSTITUENT CONSTANT SHOWN, RESP.): P, ME SUB2 P (O), 188-9DEGREES, 8.45, 0.62; M, ME SUB2 P (O), 165-6DEGREES, 8.90, 0.42; P ME SUB2 P (S), 104-5DEGREES, 8.44, 0.62; M, ME SUB2 P (S), 69 TO 70DEGREES, 8.87, 0.43; P, ME SUB3 P (IODIDE SALT), 248-9DEGREES, 7.55, 1.02; AND M, ME SUB3 P (IODIDE SALT), 219-20DEGREES, 8.03, 0.81. THE PKA VALUES WERE OBTAINED POTENTIOMETRICALLY IN AQ. SOLN. THE SUBSTITUENT CONSTS. SIGMA PRIME NEGATIVE WERE CALCD. FROM PKA DATA BY THE CORRELATION EQUATION: PKA EQUALS 9.82 PLUS 2.217 SIGMA PRIME NEGATIVE. THE ABOVE X GROUPS ARE SOMEWHAT LESS EFFECTIVE AS POLAR SUBSTITUENTS THAN ARE THE ETO SUB2 C AND AC GROUPS.

UNCLASSIFIED

1/2 -- 038 UNCLASSIFIED PROCESSING DATE--11SEP70
TITLE--POLYMERS PREPARED FROM BIS(4,CARBOXYPHENOXYMETHYL)(METHYL)PHOSPHINE
OXIDE -U-
AUTHOR--BORISOV, G., SIVRIEV, KHR., TSVETKOV, E.N., KABACHNIK, M.I.
COUNTRY OF INFO--USSR
SOURCE--VYSOKOMOL. SOEDIN., SER. A 1970, 12(3) 620-5
DATE PUBLISHED-----70
SUBJECT AREAS--CHEMISTRY, MATERIALS
TOPIC TAGS--POLYMER, ESTERIFICATION, ORGANIC PHOSPHORUS COMPOUND, CARBOXYL
RADICAL, BENZENE DERIVATIVE, POLYESTER RESIN, PHTHALATE, THERMAL
STABILITY, ADHESION, METAL TO NONMETAL BONDING
CONTROL MARKING--NO RESTRICTIONS
DOCUMENT CLASS--UNCLASSIFIED
PROXY REEL/FRAHE--1989/0242 STEP NO--UR/0459/70/012/003/0620/0625
CIRC ACCESSION NO--AP0106898
UNCLASSIFIED

2/2 038

UNCLASSIFIED

PROCESSING DATE--11SEP70

CIRC ACCESSION NO--AP0106898

ABSTRACT/EXTRACT--(U) GP-0- ABSTRACT. THE TRANSESTERIFICATION OF (4-MEO SUB2 CC SUB5 H SUB4 OCH SUB2) SUB2 P(D)ME (I) WITH HOROH (R IS (CH SUB2) SUB2, CH SUB2 CHME, (CH SUB2) SUB4, (CH SUB2) SUB5, (CH SUB2) SUB6, OR (CH SUB2 CH SUB2) SUB2 O) IN THE PRESENCE OF (ACO) SUB2 ZN AS THE CATALYST GAVE 87-90PERCENT POLYESTERS (II). SIMILARLY THE TRANSESTERIFICATION OF I,DI,ME TEREPHYHALATE MIXT. WITH HOROH GAVE A MIXT. OF II, CORRESPONDING POLYTEREPHTHALATES (III), AND COPOLYMERS. THE SOLY. OF II AND III IN CHCL SUB3 DIFFERS CONSIDERABLY, ENABLING SEPN. TURBIDIMETRIC TITRN. OF THE HOMOPOLYESTERS, COPOLYMER MIXTS., USING TETRACHLOROETHANE AS THE SOLVENT AND MECH AS THE PRECIPITANT, DEMONSTRATED THE EXISTENCE OF THE COPOLYMER. THE COPOLYMER M.P. DECREASES WITH THE INCREASE CONTENT. THE THERMAL STABILITY OF II IS SUPERIOR TO THAT OF III; AT 300DEGREES IN THE AIR II LOSE 4-52PERCENT WT. IN 3 HR. II ARE SEMI TRANSPARENT; THEIR MELTS CAN BE DRAWN INTO FIBERS AND FORMED INTO FILMS. THE COPOLYMERS CONTG. LARGER THAN 20PERCENT I UNITS LOSE 4-5PERCENT WT. AT 300DEGREES IN THE AIR DURING 3 HR. THEIR ADHESION TO STEEL INCREASES TO 84 KG-CM PRIME2 WITH INCREASING I UNIT CONTENT.

UNCLASSIFIED

USSR

UDC 546.18.181.1

TSVETKOV, YE. N., BORISOV, G., SIVRIEV, KH., MAZEVANKAYA, R. A., and KABACHNIK, M. I., Institute of Organoelemental Compounds, Academy of Sciences USSR, and Institute of Organic Chemistry, Bulgarian Academy of Sciences, Sofia

"Syntheses Based on Tetramethyolphosphonium Chloride. Some Transformations of Tri(chloromethyl)phosphine and Methyl-di(chloromethyl)phosphine Oxide"

Leningrad. Zhurnal Obshchey Khimii, Vol 40, No 2, Feb 70, pp 285-291

Abstract: The article describes some reactions of tri(chloromethyl)-phosphine and a number of transformations of methyl-di(chloromethyl)-phosphine oxide. Reactions of tri(chloromethyl)phosphine with water and with sodium acetate in glacial acetic acid are accompanied by a pseudoallyl rearrangement and yield methyl-di(chloromethyl)phosphine oxide and methyl-di(acetoxymethyl)phosphine oxide respectively. Tri-(chloromethyl)phosphine reacts with sodium ethylmercaptide in the presence of an excess of ethyl mercaptan without a rearrangement to

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USSR

TSVETKOV, YE. N., et al., Zhurnal Obshchey Khimii, Vol 40, No 2, Feb 70, pp 285-291

give tri(ethylmercaptomethyl)phosphine. Substitution reactions were staged involving the displacement of chlorine atoms in methyldi(chloromethyl)phosphine oxide by dialkylamino, alkoxy, arylhydroxy and other groups.

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USSR

UDC 542.91.547.1'118

KOVTUN, V. YU., GILYAROV, V. A., KABACHNIK, N. I., Institute of Hetero-organic Compounds of the USSR Academy of Sciences

"Obtaining Some Asymmetric Diarylimines of Tetraphenylmethylene-diphosphine"

Moscow, Izvestiya Akademii Nauk SSSR-- Seriya Khimicheskaya, No 11, 1972,
p 2612

Abstract: The experimental procedure and results are presented from using the reaction of tetraphenylmethylenediphosphine-(N-phenylimine) with arylazides to obtain tetraphenylmethylenediphosphine-(N-phenyl-N'-p-tolyldiimine), tetraphenylmethylenediphosphine-(N-phenyl-N'-m-tolyldiimine), and tetraphenylmethylenediphosphine-(N-phenyl-N'-m-chlorophenyldiimine). The paramagnetic resonance spectra were taken on the Perkin-Elmer R-12 spectrometer.

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USSR

KABAILA, V. (Vilnius State University)

"Note on the Convergence of the Dirichlet Series on the Boundary of the Region of Convergence"

Vilnius, Litovskiy Matematicheskii Sbornik; January-March, 1971; pp 109-113

Abstract: The author treats the conditions of convergence of the Dirichlet series

$$\sum_{k=1}^{\infty} a_k e^{-\lambda_k t} \quad (1)$$

with real λ_k in all boundary points of the convergence domain.

Theorem 1. Let $\{\lambda_k\}$ be a sequence of real numbers, $\sum_{k=1}^{\infty} a_k$ a convergent series of complex numbers, and $r_k = \sum_{j=k+1}^{\infty} a_j$. If

$$\sum_{k=1}^{\infty} |r_k| \cdot |\lambda_{k+1} - \lambda_k| < \infty, \quad (2)$$

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USSR

KABAILA, V., Litovskiy Matematicheskiy Sbornik, Jan-March 71, pp 109-113

then the series (1) converges in all points $z=it$, $-\infty < t < +\infty$; if the series (2) diverges and $\lim_{k \rightarrow \infty} (a_{k+1} - a_k) = 0$, then for any real number t_0 ($t_0 \neq 0$) there exists the complex set $\{a'_k\}$ for which the series $\sum_{k=1}^{\infty} a'_k$ converges, $\left| \sum_{j=k+1}^{\infty} a'_j \right| = |r_k|$, and the series

$$\sum_{k=1}^{\infty} a'_k e^{\lambda_k t_0}$$

diverges.

In the case $\lambda_k = \ln k$ the series (1) converges in all points $z=it$, $-\infty < t < +\infty$, if

$$\sum_{k=1}^{\infty} \frac{|r_k|}{k} < \infty,$$

where $r_k = \frac{1}{k} (r_1 + \dots + r_k)$.

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USSR

UDC 66.085.3/.5:678.742.2

P'YANKOV, G. N., KABAKCHI, A. N., GOLODNYI, YU. F., BRASHKIN, M. A., LOPATIN, I. P., YARMILKO, YE. G., and BORDIKOVA, A. N., Institute of Physical Chemistry, Acad. Sc. UkrSSR

"Experimental Line for the Production of Radiation Modified Polyethylene Tubes UR-0.4T"

Kiev, Khimicheskaya Tekhnologiya, No 2 (62), Mar-Apr 72, pp 50-52

Abstract: An experimental line has been constructed for the production of radiation modified polyethylene tubes. The novelty of this process is in the irradiation method. The tubes pass repeatedly through the irradiation zone in a spiral pattern, with alternating directions of the rotation, so that exposure is uniform to the radioactive source, and damage due to the radiation heat is minimal. As an example, a tube 6 mm in diameter, wall thickness up to 0.5 mm, moving at a velocity of 2m/min, after 6 passages through the chamber picks up a dose of 45 Mrads.

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UDC 678.5.06-419.8:66.035.3/.5

125

P'YANKOV, G. N., MOROZOV, A. V., OMEL'CHENKO, S. I., KARAKCH, A. M., BESSONOV, V. G.,
CHERVETSOVA, I. N., VIDENINA, N. G., DYACHOK, V. T., and GOLODNYI, YU. F., Institute
of Physical Chemistry imeni L. V. Pisarzhevskiy, Kiev, Academy of Sciences
Ukrainian SSR, and Institute of Chemistry of High Molecular Compounds, Kiev,
Academy of Sciences Ukrainian SSR

"Radiation Technology of Manufacturing Glass-Plastics"

Kiev, Khimicheskaya Promyshlennost' Ukrainy, No 4, 1970, pp 8-10

Abstract: Production of glass plastics using electron accelerators as radiation sources is described. The operating principle is explained with an example of the manufacture of a cylindrical sheet of cross winding. The mandrel speed, feed pitch, and dose strength are selected so that during the time of passage of the winding section across beam cross-section the required degree of polymerization of the binder is attained. The degree of polymerization between layers wound on top of each other is regulated by the energy of the impinging radiation and beam current. The source of fast charged particles in the model setup is an accelerator with maximum electron energy of 0.4 Mev. Electrons at this energy ensure radiation polymerization of a 0.2-0.3 mm layer of glass-plastics. In this layer, when the density of the current of the beam is several tens of microamperes per square centimeter, dose strength of 10^6 - 10^7 rads/sec is produced.

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USSR

UDC 541.15:678.742

STAREN'KIY, A. G., LAVRETOVICH, Ya. I., and KABAKCHI, A. M., Institute of Physical Chemistry, Acad. Sc. USSR

"Effect of the Type and of the Energy of Radiation on the Radiolysis of Polypropylene"

Moscow, Vysokomolekulyarnyye Soyedineniya, Vol 12, No 11, Nov 70, pp 2,476-2,480

Abstract: Isotactic polypropylene has been irradiated with γ -rays and α -particles with energy of 28 Mev in an attempt to investigate the nature of early stages in the radiolysis of this polymer. The structure of the tracks of charged particles appeared to have an effect on chemical processes. At low doses polypropylene is degraded yielding 0.86 bonds per 100 ev, while at higher doses it is crosslinked. Gel-fraction is obtained at 25 Mrad with γ -irradiation but only at 50 Mrad when α -particles were used. It was determined that γ -particles are less effective in the crosslinking process and in formation of diene and triene sequences than γ -irradiation, but they are more effective in the processes of the formation of vinylidene bonds. Possible mechanism for the primary reactions in radiolysis have been proposed.

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USSR

UDC 632.952

ANDREYEVA, YE. I., and KABAKHIDZE, D. M.

"New Preparations with Systemic Activity"

Moscow, Zhurnal Vsesoyuznogo Khimicheskogo Obshchestva imeni D. I. Mendeleev, Vol 18, No 5, 1973, pp 523-532

Abstract: A review with 124 references covering biological and chemical properties of the most familiar systemic fungicides (benzimidazoles, anilides, thiophonates, morpholines, pyrazoles, etc). Some attention is given to the mechanism of action of these compounds, as well as to the specific disease inducing activity of various classes of fungi. Toxicological data are reported in respect to the warm-blooded animals -- principally rats. Possibility of practical application of individual preparations is discussed.

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USSR

UDC: 622.011.43

KRASAVIN, A. P., KABAKOV, A. M., LABUNSKIY, L. V.

"Physical and Mechanical Properties of Cover Rock of the Korkinskiy Brown Coal Deposit"

Fiz.-Mekh. Svoystva Gorn. Porod Ugol'n. Mestorozhd. Urala i Sibiri. Vyp. 1
[Physical and Mechanical Properties of Rock from Coal Deposits of the Urals
and Siberia, No 1 -- Collection of Works], Cheiyabinsk, 1971, pp 20-27
(Translated from Referativnyy Zhurnal Mekhanika, No 12, 1972, Abstract No
12V785, by Yu. M. Kartashov)

Translation: Results are presented from laboratory studies of the physical and mechanical properties of conglomerates, gravelites, sandstones, aleurolites, argillites and coal of the Korkinskiy brown coal deposit. The compressive and tensile strength, contact strength, abrasive properties, adhesion, internal friction angle and elastic constants of the rock were determined, as well as the total carbonate content of the rock, and special petrographic studies were performed. It was found that the physical and mechanical properties of the rock studied change over broad limits. The compressive strength for the rock of the deposit varies from 23 to 1315 kg/cm², the tensile strength -- from 2 to 177 kg/cm². The main factor determining the physical and mechanical

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Krasavin, A. P., Kabakov, A. M., Labunskiy, L. V., Fiz.-Mekh. Svoystva Gorn. Porod Ugol'n. Mestorozhd. Urala i Sibiri. Vyp. 1, Chelyabinsk, 1971, pp 20-27.

of the rock in the range of mining conditions studied is the degree of carbonatization. With increasing total carbonate content, the strength and mining indicators increase. The rocks were divided into three groups as to carbonate content: clay types with total carbonate content up to 15%, carbonate-clay with total carbonate content 15-30% and carbonate types with total carbonate content over 30%.

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USSR

UDC: 621.372.852.1

KISLYAKOVSKIY, A. V., KUSHCH, S. N., and KABAKOV, L. T.

"Selective Waveguide Modulator"

Kiev, Izvestiya VUZ SSSR--Radioelektronika, No 9, 1972, pp 1179-1182

Abstract: A waveguide modulator using a ferrite resonator and having high selectivity is proposed. It permits modulation with frequencies up to several megahertz. Its basic structure is that of a tunable waveguide filter in which the input and output waveguides intersect at right angles such that their broad walls are parallel, with the waveguides interconnected by a circular limiting waveguide and the ferrite resonator. Further details of its structure and of special precautions taken in its design are given. The transmission coefficient of the modulator as a function of the detuning and the amplitude of the modulating magnetic field is determined, and the Fourier series coefficients proportional to the amplitudes of the individual harmonics at the modulator output are found. Suggestions are made for reducing the losses and dimensions of the modulator as well as increasing its selectivity.

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USSR

UDC: 519.2

KABAKOV, V. A.

"Concerning One Approach to Using the Method of Stochastic Approximation for Statistical Modeling Problems"

V sb. Vopr. tekhn. i inform. obespecheniya ASU (Problems of Hardware and Software for Automatic Control Systems--collection of works), Novosibirsk, 1971, pp 34-37 (from RZh-Kibernetika, No 5, May 72, Abstract No 5V135)

Translation: Let $f(x)$ be the probability density function of a homogeneous random quantity X . In processing the results of statistical modeling where density $f(x)$ is unknown, the following problem arises. On the basis of realization of random quantity X to find the root y of equation

$$J = \int_a^y f(x) dx, y > a.$$

for given a and J . It is proposed that the method of stochastic approximation be used to solve this problem. For this purpose, (1) is converted to the following form

$$\int_{-\infty}^{+\infty} [\tau_a(x, y) - J] f(x) dx = 0,$$

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